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[Introductory p. i]

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University of California, Berkeley, Ph.D., 1965
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[Introductory page ii]

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[Introductory p. iii]

Subsistence Ecology of !Kung Bushmen

By

Richard Barry Lee
A.B. (University of Toronto) 1959
M.A. (University of Toronto) 1961

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Anthropology

in the

GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA, BERKELEY

Approved:
S. L. Washburn
Clarence J. Glacken
James N. Anderson

Committee in Charge

Degree conferred..
Date

[Introductory p. iv]
[title page].

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[Introductory p. v]

PREFACE

114 The Bushmen of southern Africa have long held a fascination for anthropologists because of their unusual language, culture and physical type. Physical anthropologists have been intrigued by the apparently unique morphological adaptations of the Bushmen (such as steatopygia and the tablier) and the problem of the racial status of the Bushmen (Broom 1941, Coon 1955, 1962, Dart 1937, DeVilliers 1961, Tobias 1961, 1964). Linguists have focussed attention on the unique click languages of the Bushmen (W.H.I. Bleek and Lloyd 1911, D.F. Bleek 1929, 1956, Vedder 1910-11, Maingard 1957, Westphal 1963).

It is curious, in light of this interest, that, until recent years, professional investigations of Bushman sociology and ecology have been conspicuously lacking in the literature. In 1930, Schapera summarized the information then available on Bushmen. His sources consisted mainly of the accounts of early travellers such as Barrow (1801-04), Burchell (1822-24), Baines (1864), and Chapman (1868), as well as the reports of administrators in the German South West African government such as Werner (1906), Seiner (1913), and Passarge (1905, 1907).

With the exception of Bleek's monograph on the Nharo (1928b), which discussed social organization, all of Schapera's sources consisted of fragments of information or were based on the memory ethnography of highly acculturated Bushmen. J.H. Wilhelm's account of !Kung social structure is perhaps the best of the early research, but this study, written in 1917, was not published until 1953 and therefore was not available to Schapera. In spite of the works of Bleek (1928b) and Wilhelm (1953), our information on the social organization and economy of Bushmen at the turn of the century is extremely sparse. Thus the students of Bushman culture have had no baseline study available to them such as the classic researches of Spencer and Gillen (1899, 1904, etc.) on the Australian aborigines.

Schapera's task in his classic, "The Khoisan Peoples of South Africa" (1930), was to salvage the ethnographic facts of a dying way of life. The tone of his book is set by the statement: "There seems little doubt that the Bushmen are steadily dying out as a race. What relentless persecution at the hands of other peoples has not achieved is being slowly accomplished by disease and racial intermixture. Racially pure Bushmen are already in a minority and their ultimate absorption by their neighbors is probably inevitable." (1930:40).

This point of view prevailed for the twenty years following the publication of "The Khoisan Peoples" and was

114 manifested by a virtual absence of sociological research among the Bushmen during the 1930's and 40's.

It was not until the 1950's that it became apparent that Schapera's obituary on the Bushmen was premature. We owe this realization to the recent research and writing of Mr. and Mrs. Laurence K. Marshall and Professor Phillip V. Tobias. The Marshalls began their investigations of Bushman life in 1951.
[161] In the interior of the northwestern Kalahari they found over 1,000 Bushmen organized into hunting and gathering bands. This was, and is, a full-scale viable way of life of a type that was believed no longer to exist. Professor Tobias, after visiting the Kalahari with the Panhard-Capricorn Expedition of 1950, was led to believe that the numbers of surviving Bushmen had
[161] been vastly underestimated. His subsequent research (1956, 1957) showed that there were over 50,000 living Bushmen and that thousands of the Bushmen were living as hunter-gatherers.

[121] Due to the stimulus of the Marshalls and Tobias, anthropologists realized that excellent research opportunities among the Bushmen had been overlooked, simply because of the mistaken notion that the hunting and gathering way of life had ceased to
121 exist. Thus in recent years the style of Bushman research has been transformed from a salvage operation to the study of viable ongoing social and economic systems; and with the acquisition of new data has come a basic reorientation of our

121 view of the Bushmen. The present study is a contribution to this reorientation and, as such, has implications, not only for Bushman studies, but for the study of hunters and gatherers in general.

The study of subsistence ecology focusses attention on those aspects of the man/environment relation which pertain to the getting of food. Since there are populations of Bushmen available which still maintain a full-time, year-round, hunting and gathering way of life, an investigation of subsistence ecology can be founded on a firm empirical basis. The investigator does not have to rely on the memory of informants concerning conditions no longer in existence.

121 Another recent study - of the subsistence activities of
114 Australian aborigines in Arnhem Land (McCarthy and McArthur 1960)
171 - offers an instructive contrast to the present study. Both
studies are concerned with the subsistence ecology of hunter-
gatherers. The difference lies in the fact that the Australian
groups studied spent the greater part of each year living on
mission stations where they ate European foods. Consequently,
the Australian scientists could observe traditional food
getting for two week periods that were bracketed by periods of
residence on the mission stations. The Bushman study, on the
other hand, is a continuous record of hunting and gathering
121 activities extending over a fifteen month period. The Dobe area
222 224 Bushmen were hunting and gathering for the simple reason that

121 there was no viable alternative locally available to them.

222
224 The presence of these conditions has made it possible not only to observe ongoing subsistence behavior, but also to attempt to understand the dynamics and the underlying rationale of hunting and gathering as a total way of life.

R.B.L.

Cambridge Mass.,
July 1965.

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ACKNOWLEDGEMENTS

122 It is a great pleasure to be able to thank at least some of the people and institutions who have made possible this study of the Kalahari Bushmen. The research was supported by a grant from the National Science Foundation to Dr. Irven Devore for "Studies in the Evolution of Human Behavior". This grant was administered by Harvard University. [114] The government of the Bechuanaland Protectorate was kind enough to issue a research permit to Dr. Devore and me for the period 1963-65. The Directors of the Livingstone Museum[1], Livingstone Zambia allowed us to use the museum as a base of operations during the study period, and graciously placed the clerical and research facilities of the museum at our disposal.

000 I am grateful for the initial encouragement and continuing guidance of my undergraduate and graduate teachers, particularly Professors Ronald Cohen[2], Robert C. Dailey, and J. Norman Emerson at the University of Toronto; and Professors Sherwood L. Washburn and J. Desmond Clark at the University of California, Berkeley.

---

[1] formerly the Rhodes-Livingstone Museum.
[2] at present at Northwestern University, Evanston, Ill.

128 Thanks are due to several colleagues in central Africa who offered valuable technical assistance: to Mr. Reay H. N. Smithers, Director of the National Museums of Rhodesia, for identifications of vertebrate fauna and for providing the mammalian weights used in Chapters V and VIII; to Mr. Graham Guy, Curator of the Queen Victoria Museum, Salisbury, for training in field botany; to Mr. R. B. Drummond, Systematic Botanist, and the staff of the National Herbarium of Rhodesia, for determinations of over 300 plant specimens; and to Mr. Clayton Holliday, Senior Technical Officer, and the staff of the Livingstone Museum for kind and generous assistance beyond the call of duty.

I owe a special vote of thanks to Dr. Brian Fagan of the British Institute of Archaeology, Nairobi[1], for his unfailing logistic support.

A number of South African specialists in Bushman studies and related fields have contributed useful suggestions: Dr. John Blacking (ethnomusicology), Dr. Stanley Blecher (genetics), Dr. H. J. Heinz (parasitology), Prof. Phillip Mayer (social anthropology), and Prof. Phillip V. Tobias (physical anthropology). All of the above are on the staff of the University of Witwatersrand, Johannesburg. Thanks are due,

---

[1] formerly Keeper of Prehistory, Rhodes-Livingstone Museum, Livingstone, Zambia.

00* as well, to Ernst O. J. Westphal, Professor of African Languages, University of Cape Town; to Miss Margaret E. Shaw, Keeper of Ethnography, South African Museum, Cape Town; and to Mr. B. J. Grobbelaar, Ethnologist, and Miss Rona MacCalman, Archaeologist, both of whom are at the State Museum in Windhoek, South West Africa.

I want to thank the officers of the Bechuanaland Protectorate Government for their cooperation and hospitality, particularly Mr. and Mrs. Phillip Brown of the Tsetse Fly Control Unit, Nokaneng; Mr. Robert Gilkes, District Officer, Maun; Messrs. Eustace Clark and Ian Gass, District Commissioners, Ngamiland; and Mr. George B. Silberbauer, formerly Officer-in-Charge of the Bushman Survey of the Bechuanaland Protectorate.[1]

Special thanks are due to Mrs. E. Moremi, head of the Batawana Tribal Administration (and Regent of the Tribe during the minority of her son Letsolatebe, the Paramount-chief-elect) for permission to conduct research in the Batawana Tribal District. Thanks are due, as well, to Headman Isak Utuhile, [124] whose administrative district includes the Dobe area. While in the field I received valuable assistance from Hakekgoshe Isak, interpreter; Enoch Tabiso, cook; and Onesimus Mbombo, driver-mechanic.

---

[1] at present at the University of the Witwatersrand.

000 I am indebted to Miss Chris Boldt and Mrs. Barbara Smith of Cambridge, Mass., and to Miss Lucy Patrick of Toronto for typing this manuscript. Mr. G. J. Matthews, Department of Geography, University of Toronto drew all the maps and figures contained in the thesis. Mr. John Glover, also of the University of Toronto, photographed these maps and figures.

To those colleagues and comrades who joined the expedition for varying periods to work among the Bushmen, I owe a special debt of affectionate gratitude: Miss Susan Bucklin, Chicago, Illinois; Mr. Adam Kuper, King's College, Cambridge University; Monsieur Francis Van Noten, Musée Royal de l'Afrique Centrale, Belgium; and Mr. Stanley Washburn, Berkeley, California.

Finally I am delighted to acknowledge my debt to Dr. Irven Devore of Harvard University. This study has benefitted immeasurably from Dr. Devore's participation at every stage. From the initial conception of the study at Berkeley, California in 1961 to its completion at Dobe, Bechuanaland in January 1965, Dr. Devore has been an active research partner and friend. My gratitude extends, as well, to Mrs. Nancy Devore for her continuing moral support.

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I. INTRODUCTION

121 114 122 This dissertation is a report on the results of a field investigation of Kalahari Bushmen in 1963-64. The research was supported by a grant from the National Science Foundation 121 entitled: Studies in the Evolution of Human Behavior. The section of the research proposal devoted to Bushmen outlined five major areas of investigation:

1. Census
2. Demography
3. Subsistence
4. Social organization
5. Settlement patterns

The data obtained in the areas of census and subsistence are presented here. Further data on demography, social organization and settlement patterns are summarized here and will be expanded in subsequent publications.

The Bushman research project was conceived to answer a need on the part of archeologists and other students of human evolution for accurate, quantitative information on the subsistence and society of a contemporary hunting and gathering people. It was hoped that such a study would generate new insights on cultural evolution and aid in the task of interpreting archeological materials. The primary task was to define the properties of a hunting and gathering way of life.

[21] This statement was then to be employed as a basis for comparison with other living hunting and gathering societies and the generalizations so derived were to be used as a baseline for the reconstruction of the properties of societies and economies of earlier populations of man.

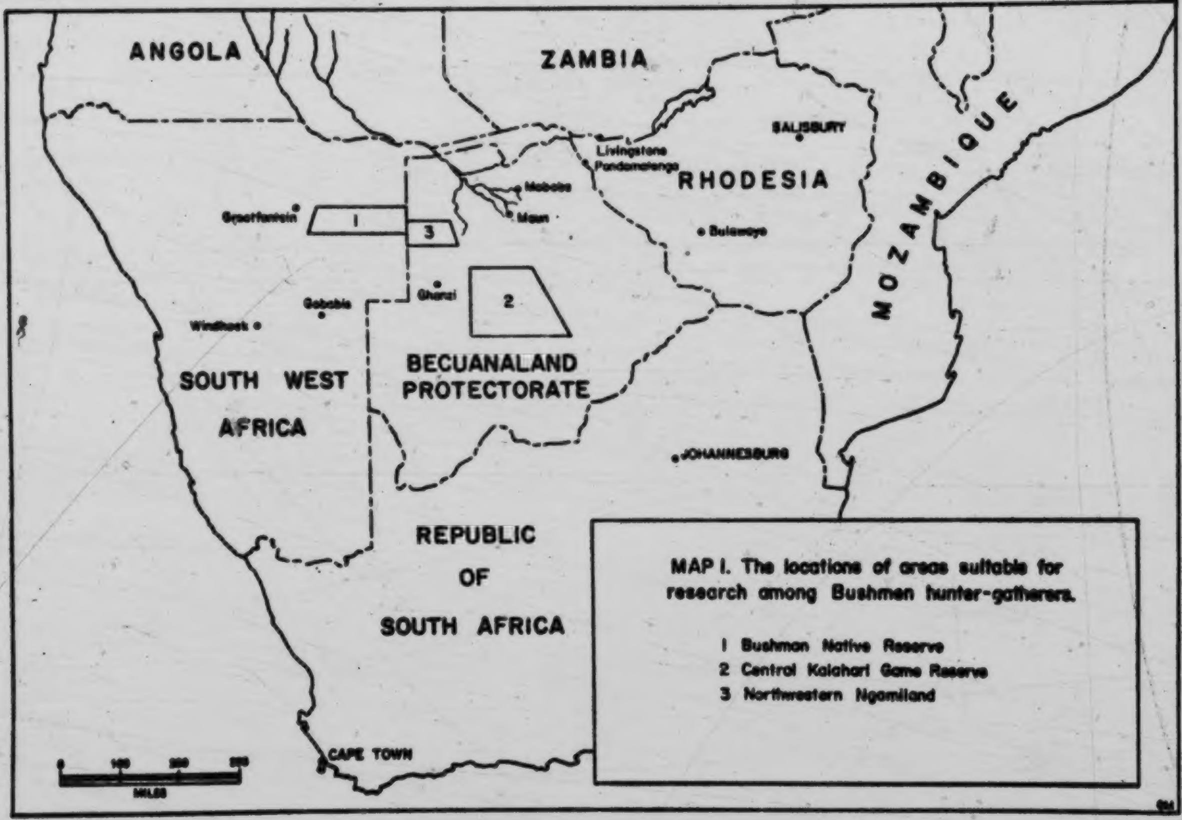
Of the three stages in this research scheme, description, comparison and reconstruction, only the first stage is presented in this dissertation viz the description of the subsistence of one hunting and gathering people.

The Kalahari Bushman study began in August 1963, when Irven DeVore and the author made a reconnaissance of the northern Kalahari Desert to look for a suitable study site. The research goals required a population as isolated and traditionally oriented as possible. Three locations were considered (see Map 1).

1. The Bushman Native Reserve, South West Africa
2. The Central Kalahari Game Reserve, Bechuanaland
3. Northwestern Ngamiland

[114] South West Africa proved to be out of the question. For political reasons foreign scientists are not being permitted to work among the indigenous peoples. The British colonial government of Bechuanaland, on the other hand, has encouraged social scientists from abroad to come and work among the tribes. Our decision to work in northwestern Ngamiland was dictated by the fact that a government-appointed anthropologist

[TEXT CONTINUED ON PAGE 4]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MAP I. The locations of areas suitable for research among Bushmen hunter-gatherers.

1 Bushman Native Reserve
2 Central Kalahari Game Reserve
3 Northwestern Ngamiland

102
131

121 (George Silberbauer) was already conducting research among the Bushmen of the Central Kalahari Game Reserve.

After DeVore's return to Harvard in September, the author surveyed the Ngamiland situation and found that the Bushman population in the northwestern sector satisfied our research requirements.

161 312 In October, 1963, there were about 430 Bushmen living at 621 nine waterholes in the !Kangwa administrative district. Over 224 70% of these people were organized into bands and depended on 222 hunting and gathering for their subsistence. Although some 648 340 Bantu lived in the district they had not established a lord-client relationship over the Bushmen. This feudal type of social system exists elsewhere in the Kalahari but not in 114 the !Kangwa district. The author was the first white person to live in the district. The Marshall expeditions had touched the western edge of the district but had centered their research at /Gautscha, a camp about 40 miles west of our area.

The main field station was set up at Dobe, a small waterhole in Bechuanaland, two miles east of the Bechuanaland - South West Africa border. The author conducted research here for twelve months, except for intervals of work elsewhere in the Kalahari and study periods in Livingstone, Johannesburg, Windhoek and Capetown.

In October, 1964, Irven and Nancy DeVore joined the author

[TEXT CONTINUED ON PAGE 6]

TABLE 1

Periods of Research, Camps and Seasons of the Kalahari Bushman Study

114
131
132

Period	Location	Season
1963		
August	on survey, northern Kalahari	winter, cool dry
October-December	Dobe	end of hot dry, small rains, main rains
1964		
January-February	Tsodilo	main rains
late February-end April	Dobe	end rains, onset of winter dry
early May	Tsodilo	onset of winter dry
mid June	on survey, southern Kalahari	winter cold dry
late June-early September	Dobe area	winter cold dry
September	Kuli-Ghanzi	spring hot dry
late October-December	Dobe area	end of hot dry, small rains
1965		
early January	Dobe-Maun	small rains

114 and we worked jointly at Dobe until the study terminated on January 8, 1965. The study dates and places are summarized in Table 1.

A note on orthography

197 The linguistic status of the !Kung Bushmen will be dis-
194 cussed in Chapter II. As there is still no general agreement
among linguists on the phonemes of the !Kung language, a
brief list of phonemes is offered here to facilitate the pro-
nounciation of Bushman words used in the text.[1]

Vowels

1. i - as in English "fit, feet"
2. e - as in English "fate, fed"
3. ə - as in English "the, but"
4. u - as in English "book, boor"
5. o - as in English "bore, ball"
6. a - as in English "bat, bar"

Dipthongs

7. au - as in "cow, now, thou"
8. ai - as in "by, sky, bite"
9. ei - close to "bay, bait"
10. iu - no English equivalent; falls between "see" and "Sue"

---

[1] A phonemic analysis of !Kung is in preparation and will be presented elsewhere. The present listing is oversimplified.

Consonants

11. b - as in English "bug"

12. d - as in English "die"

13. g - as in English "guy"

14. m - as in English "my"

15. n - as in English "nigh"

16. ŋ - as in English "sing"; as in Bantu "ngombe"

17. s - as in English "sigh"

18. z - as in English "zoo"

19. š - as in English "shy"

20. ž - as in French "jamais"

21. x - as in Afrikaans or Dutch "groote"

22. h - as in English "home"; also to indicate aspiration after a vowel or consonant

23. w - as in English "why, twin"

24. ts - as in Bantu "tsetse"

25. tz - no English equivalent

26. tč - as in English "church"

In addition there are a number of phonemes that are exotic to most speakers of English.

Clicks

27. / - dental click, produced by drawing the tip of the tongue sharply away from the lingual (back) surface of the upper incisors. In some dialects of English

it is used to denote mild reproach. The sound is sometimes written "tch tch".

28. ≠ - alveolar click; the tongue position is the same for the dental click, but the blade (not the tip) is drawn sharply away. This produces a flat popping sound of shorter duration than the sound of the dental click.

29. // - lateral click; the tip of the tongue is pressed against the alveolar ridge, but the sound is produced by drawing the lateral edges of the tongue sharply away from the lingual side of the cheek teeth; the sound produced resembles that used when urging on a horse. There is no way of putting this into writing.

30. ! - alveolar-palatal click; the tongue tip is pressed against the roof of the mouth and drawn sharply away; a hollow popping sound is produced.

31. ' - glottal stop; a brief closure of the vocal cords which does not in itself produce a sound but colors the following sound material by making its release more abrupt, as in the pronunciation of "bottle" in some Scottish dialects.

32. " - glottal flap; this sound apparently has never been described in human language. Pike's (1943,1947) exhaustive studies of phonetics and phonemics do not

mention it. This is a glottal stop with a distinctly audible flap of the surfaces of the glottis. In !Kung it is one of the most common sounds following clicks.

33. r - dental-alveolar flap: this sound appears only medially in words. It has some of the sound quality of "l", "r", and "d" in the series: pallette, parrot, padded, when each is pronounced rapidly.

In addition there are three kinds of suprasegmental phonemes in !Kung: tone, nasality, and vowel pressing.

Tone There are five tone levels. The symbols are illustrated below, using a series of !Kung words that are distinguished by tone.

34. ¯di - "female" (high tone)
35. _di - "heavy" (low tone)
36. \di - "lightning" (low-falling tone)
37. ′di - species of insect (high-rising tone)
38. di - "crazy" (mid tone, no diacritic marker)

Nasality All vowels may be nasalized and this is phonemic. The symbol is the nasal modifier "~" above the vowel.

39. ĩ, ẽ, ã, ũ, õ

Pressing All vowels may be pressed or pharyngealized. This is represented by a dash below the affected vowel. Thus:

40. i̲, e̲, a̲, u̲, o̲

(Vowels that are both pressed and nasalized have both the subscript and the superscript viz: ĩ̲, ẽ̲, etc.)

The Bushman alphabet

For purposes of this study the !Kuŋg Bushman alphabet reads as follows:

a, b, d, e, ə, g, h, i, m, n, ŋ, o, r, s, š, ts, tč, tz, u, w, x, z, ž, /, ≠, //, !, ', ",

II. THE PRESENT STATUS OF THE BUSHMEN

Defining Bushmen

101 Bushmen may be defined racially, linguistically or
culturally. None of these criteria used alone will give a
142 satisfactory definition. If the presence of "Bush" physical
144 type is used as the criterion of Bushman status, then some
members of Hottentot tribes would be incorrectly included,
and members of the hybridized Bushmen peoples of Ngamiland
197 would be excluded. Similarly the presence of a click non-
121 Bantu language would include not only Hottentots again, but
also the Hottentot speaking negroid Bergdama of South West
224 Africa, and the Hadza-Sandawe peoples of Tanganyika. A
222
464 strictly economic criterion, such as the presence of a hunting
648 and gathering way of life would arbitrarily exclude the many
241
233 thousands of Bushmen who are working on European Farms or
practicing agriculture and pastoralism.

114 A further complication in defining Bushmen is offered by
197 the recent work of Westphal (1962a,1962b,1963). He has demon-
strated that the so-called Central Group of Bushman languages
of Bleek (1929) are in fact closely related to Hottentot.

101
[114] In this paper a simple ethnic definition of Bushmen is
adopted, following the lead of Joyce (1939) and Tobias (1956).
Throughout Bechuanaland, the Tswana word "sarwa" is applied to

101 non-Bantu, click-speaking peoples with a tradition of hunting and gathering in their recent past. Thus we may define Bushmen as members of tribes who are acknowledged to be "sarwa" by themselves and others. The term "sarwa" thus includes peoples of varying physical type and economy, and of four distinct linguistic stocks within the click family of languages. The one characteristic common to them all is the tradition of hunting and gathering. The economic and linguistic divisions will be elaborated below.

Numbers and distribution

161
114 The Bushmen are numerically stronger than has been generally supposed. Estimates such as Schapera's 7,000-7,500 (1930), Keith's 6,000 (1948), and Coon's "few hundred" (1955) are far too low. Despite Tobias' careful estimate of 55,000 living Bushmen (1957), the older misconceptions still persist. As recently as 1963, Bohannan estimated the numbers of living Bushmen in the hundreds (Bohannan 1963:213).

161
127 The author's estimate, based on data available in 1964, shows a total figure rather smaller than that of Tobias' 55,000. It is estimated that there are about 44,100 Bushmen alive today. This figure is based on published sources and unofficial government estimates for Bechuanaland. For South West Africa, the figures are adapted from the Odendaal Commission Report (Republic of South Africa, 1964). For Angola,

161 127 the Tobias estimate is retained. The estimates for other countries (Zambia, Rhodesia, South Africa) are informed guesses.

The national totals and the sources of information are:

Bechuanaland	24,600	Schapera, 1952; Silberbauer, 1965; Silberbauer, personal communication; Kuper, personal communication; author's field census.
South West Africa	15,000[1]	Republic of South Africa, 1964; Macintyre, personal communication.
Angola	4,000	Tobias, 1956,1957,1964, personal communication.
Republic of South Africa	100	Author's estimate.
Zambia	200	Author's estimate.
Rhodesia	200	Author's estimate.
TOTAL	44,100	

The distribution of these 44,100 Bushmen is illustrated in Map 2, p. 14.

---

[1] The official 1960 census figure for Bushmen in S.W.A. is 11,762. The Odendaal Commissioners note in their report: "Statistical surveys of this group (the Bushmen) are made difficult by their nomadic way of life. According to the Department of Bantu Administration and Development these Bushmen number several thousands more" (Republic of South Africa, 1964:29, footnote 4). Since this view coincides with that of the author, the number of Bushmen in S.W.A. has been rounded out to 15,000.

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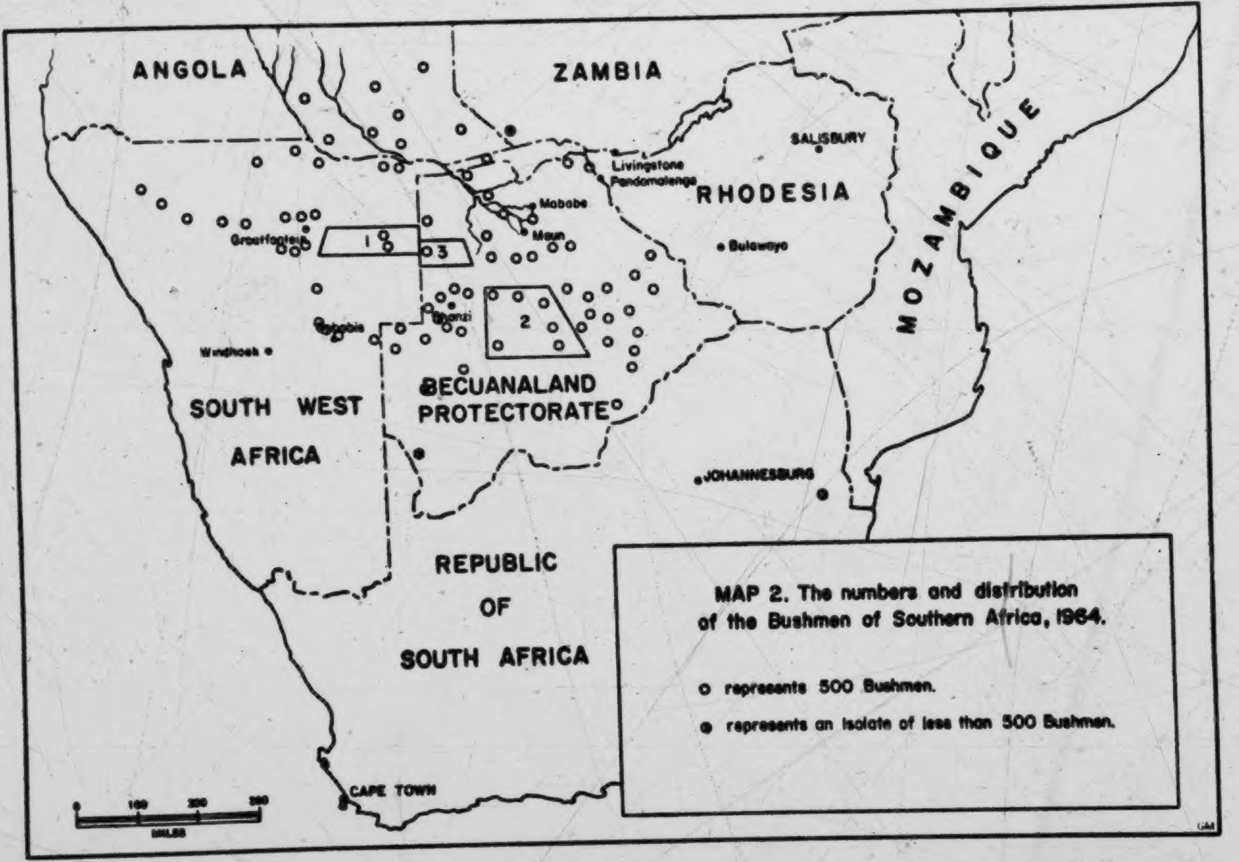

MAP 2. The numbers and distribution of the Bushmen of Southern Africa, 1964.

○ represents 500 Bushmen.
● represents an isolate of less than 500 Bushmen.
ANGOLA
ZAMBIA
RHODESIA
MOZAMBIQUE
SOUTH WEST AFRICA
BECUANALAND PROTECTORATE
REPUBLIC OF SOUTH AFRICA
Salisbury
Livingstone
Pandamatenga
Mababe
Maun
Bulawayo
Grootfontein
Gobabis
Ghanzi
Windhoek
JOHANNESBURG
CAPE TOWN
1
2
3
0
100
200
300
MILES
GM

Languages

197
114 Due to the recent work of Westphal (1962a, 1962b, 1963), the classification and geography of the click languages has been put on a firmer footing. The author's observations confirm Westphal's scheme in its essentials, but differ on certain details.

197 Among the peoples called Sarwa there are two major linguistic subdivisions:

1. A group of genetically related languages which collectively and individually are related to the Nama and Korana dialects of Hottentot. These languages are called by Westphal Tshu-khwe and were formerly known as the Central group of Bushmen languages.

2. Three languages which are distinct from the Hottentot-related group and distinct from one another. These Westphal calls "Bush A, B, and C." Bush A used to be known as Northern Bushman, Bush B and C as Southern Bushman.

The distribution of these languages is plotted on Map 3, p. 16.

Tshu-khwe - Five related languages are distinguished here. It appears that adjacent dialects are mutually intelligible, but speakers of languages that are geographically separated cannot understand each other.

The five languages are:

Xũ - known as Kwengo in Barotseland, Hukwe in the Eastern

[TEXT CONTINUED ON PAGE 17]

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10

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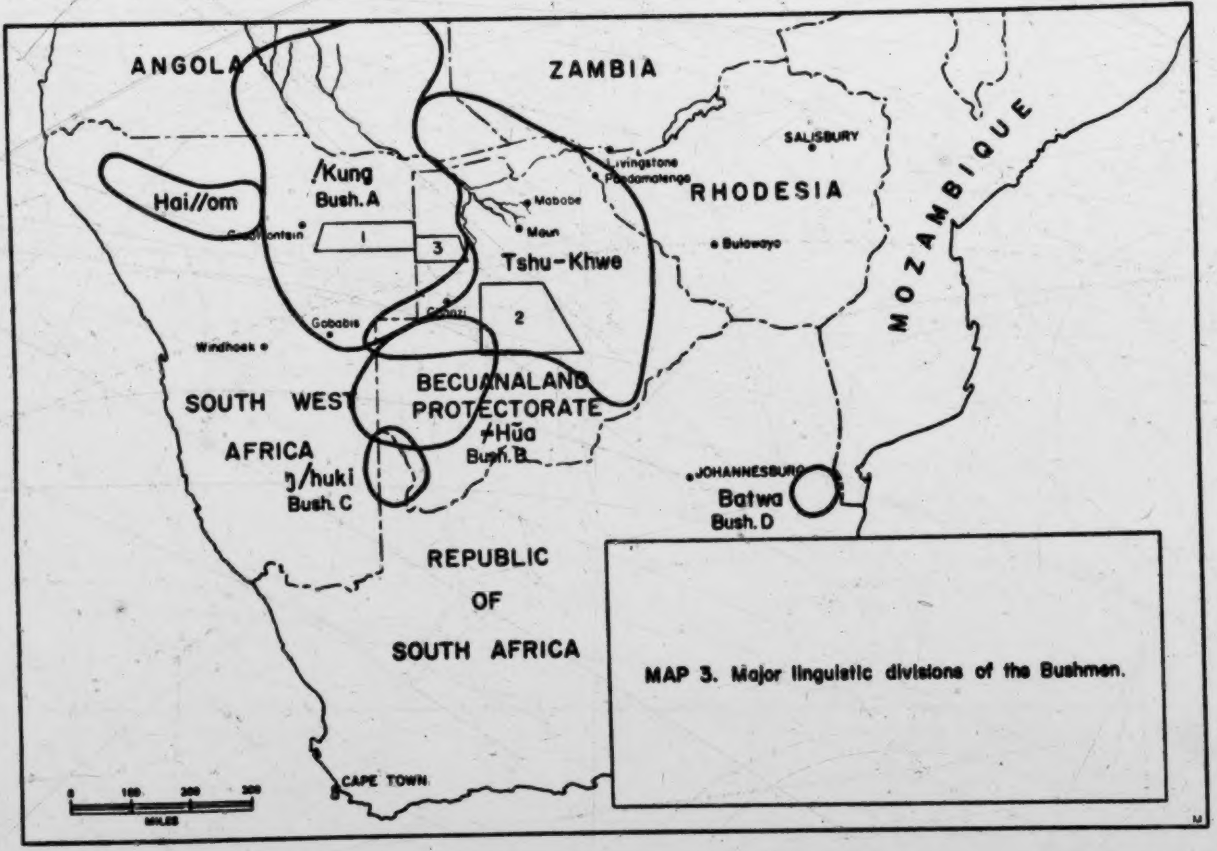
ANGOLA
ZAMBIA
MOZAMBIQUE
SALISBURY
Livingstone
Pandamatenga
RHODESIA
/Kung
Bush. A
Hai//om
Grootfontein
1
3
Mababe
Maun
Bulawayo
Tshu-Khwe
2
Ghanzi
Gobabis
Windhoek
BECUANALAND
PROTECTORATE
≠Hũa
Bush. B
SOUTH WEST
AFRICA
ŋ/huki
Bush. C
JOHANNESBURG
Batwa
Bush. D
REPUBLIC
OF
SOUTH AFRICA
CAPE TOWN
0
100
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MILES

MAP 3. Major linguistic divisions of the Bushmen.

197 Caprivi, and Bukakwe in the Western Caprivi; also found in southeastern Angola.

Shua - the major click language of the Panda-ma-tenga area; also includes Danisin and other dialects of the Mababe area.

//gabake - Hiechware and Ganade are included here; spoken at Panda-ma-tenga, Nata and possibly in the Wankie area; very closely related to Shua.

Deti - the language of the Tete or Tletle people who live along the Botlete River; not mutually intelligible with //gabake although they are genetically related.

Nharo - the main click language spoken on the Ghanzi Farms; there are several important related dialects: N/hai, spoken in the Lake Ngami area,[1] //gana of Central Bechuanaland, and /Gwi of the Central Kalahari Game Reserve.

197
114 For a more complete catalogue of dialects, the reader is referred to Westphal (1963:248ff). His use of the term Hottentot to apply to the above peoples who are ethnically Bushmen is unfortunate, since he has not demonstrated that the Tshu-khwe peoples are, in fact, derived from the Hottentot. It is more likely that both are derived from a common

---

[1] Westphal considers this as a separate language. I found it to be only a dialect of Nharo.

197 [114] proto-Hottentot, proto-Bushman ancestor.

Bush - Unlike the five Tshu-khwe languages, the three Bush languages cannot, on the basis of accepted linguistic procedures, be shown to be genetically related. The author, in an attempt to replicate Westphal's vocabulary comparisons, made a lexicostatistic trial on two languages: Bush A (!Kung), and Nharo (a Tshu-khwe language). The percentage of cognates was 11.5% but no rules of regularized sound shifts could be demonstrated between the two languages. Therefore the possibility is strong that the incidence of cognates is fortuitous or due to borrowing. The same low order of cognation was found when Bush A was lexicostatistically compared with Bush B.

The three Bush languages are:

A. !Kung; the subject of this dissertation. Also known in the literature as Kung, !xũ, Auen, Kaukau, and //au//ei; !Kung speakers extend from the Ghanzi farms in the south through western Bechuanaland and northeastern South West Africa, north into Angola.

B. ≠hũa; also known as Magong, !xõ (not to be confused with !xũ), !xoŋ, ʘwaʘwani.[1] These people live south of Ghanzi farms and extend into the Kalahari Gemsbok Game Reserve of South Africa.

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[1] ʘ is the symbol for the 5th Bushman click, known as the kiss click. This click is confined to Bush B, C and D languages and therefore not considered in the linguistic sketch of Chapter I.

197 c. -ŋ/huki; also known as ≠khomani (Doke 1936) and //n-!ke (Bleek 1929). A very small group now confined to the Gemsbok Park.

The numerical strength of the various Tshu-khwe and Bush languages are estimated as follows:

Xũ (Kwengo)	2,000
Shua (Danisin etc.)	3,000
//gabake (Hiechware etc.)	10,000
Deti (Tletle)	2,000
Nharo (/gwi, //gana etc.)	9,000
Bush A (!Kung)	13,000
Bush B (≠hũa)	1,600
Bush C (ŋ/huki)	50
TOTAL	40,650

The remaining 3,450 Bushmen of the estimated total of 44,100 include over 3,000 Hai//om (Heikum) in South West Africa. These people speak a dialect of Nama Hottentot and have a tradition of hunting and gathering although only a small proportion do so today. Also included in the remainder are a small group of people around Lake Chrissie in the
[101] Eastern Transvaal. They are locally known as Batwa and number
[114] less than one hundred. Westphal includes them as his Bush D language and calls them "//xegwi." (See also Lanham and Hallowes 1956; Potgieter and Ziervogel 1955).

The economic position

114 Tobias erred when he estimated that in 1956, 35,000 of
224
222 the 55,000 Bushmen "lead a hunting and food-gathering life,
161 barely removed from that of the late Upper Palaeolithic or
of the South African Later Stone Age." (1957:33). The first comment concerns the numbers of Bushmen still hunting; the second the "primitiveness" of the modern Bushmen hunters.

162 Of the 15,000 Bushmen in South West Africa at least
131 9,500 are working on European farms. An additional 3,000
464
648 are either working for Bantu agriculturalists or practicing
224 agriculture and stock-keeping themselves. (Republic of South Africa 1964:29,41). This leaves 2,500 as hunter-gatherers in South West Africa.

In Bechuanaland an estimated 16,300 Bushmen work on European farms or Bantu cattle posts. A further 2,000 are practicing a mixed agricultural and hunting way of life. The remaining 6,100 lead a hunting and gathering way of life. The main concentrations of the latter are in the Central Kalahari Game Reserve (3,000) and in western Ngamiland (1,600).

The Batwa of the Lake Chrissie area have been working on European farms for nearly a century (Potgieter and Ziervogel 1955:3). The Bushmen in the Gemsbok Park are a major tourist attraction, but may do some hunting.

In Rhodesia, the Bushmen in the Wankie area are all

162 working on farms. Many of the Pandamatenga Bushmen work in
131
464 Victoria Falls and Livingstone. Some have gone as far afield
648 as Lusaka and Salisbury looking for work. The Kwengo Bushmen
224 of Barotseland no longer maintain a hunting way of life.
(Clark, personal communication). Their numbers are estimated
at 200.

161 This tally of Bushmen hunter-gatherers gives a total of
162
224 9,300 against an overall total of 44,100 Bushmen. Twenty
222 percent of the Bushmen hunting full time seems a much more
[114] reasonable proportion than Tobias' 64 percent. It is unlikely
that a change of such magnitude could have occurred between
the date of his census (1956) and the present one (1964).

162 The figure of 9,300 is nevertheless quite substantial
224
222 and indicates the remarkable persistance of the hunting-
178 gathering way of life in spite of the fact that even the most
isolated of the hunting tribes maintain close contact with
184 their European ard Bantu neighbors. A large proportion of
[221] the /Gwi Bushmen of the Central Kalahari Game Reserve spend
[648] part of the dry season squatting on European farms adjacent
[312] to their area. In the north the hunting !Kung often share
[464] their waterholes with Bantu cattle herders. Most of the
[233] young !Kung men spend a year or more working as cattle herds
on a contract basis.

000 As far as is known, all Bushmen hunting today have had

177 411 415 291 As far as is known, all Bushmen hunting today have had metal weapons, and utensils and clothing of European manufacture for at least 40 years.

162 433 Among the 34,800 Bushmen classified as non-hunting, there are, of course, many degrees of economic development. At one extreme, there are the second generation farm Bushmen of the Grootfrontien, Gobabis and Ghanzi Districts who have permanently given up the traditional subsistence round. Other farm Bushmen spend the rainy season living in the veld and work on the farms only in the winter dry season.

Many of the Bushmen in Ngamiland and the Crown Lands have made an excellent adjustment to modern conditions. For instance the Mababe and Pandamatenga people enjoy a settled village life combined with hunting for cash furs with rifles and steel traps. Many of the men work for hunting safaris where they have gained a good reputation as trackers and gun bearers.

433 The distribution of the various economic patterns is plotted on Map 4. There are four categories:

1. Full time hunting and gathering
2. Bantu-associated peoples with traditional lord-client relations
3. Independent villages with cash hunting and wage labor
4. European farm workers

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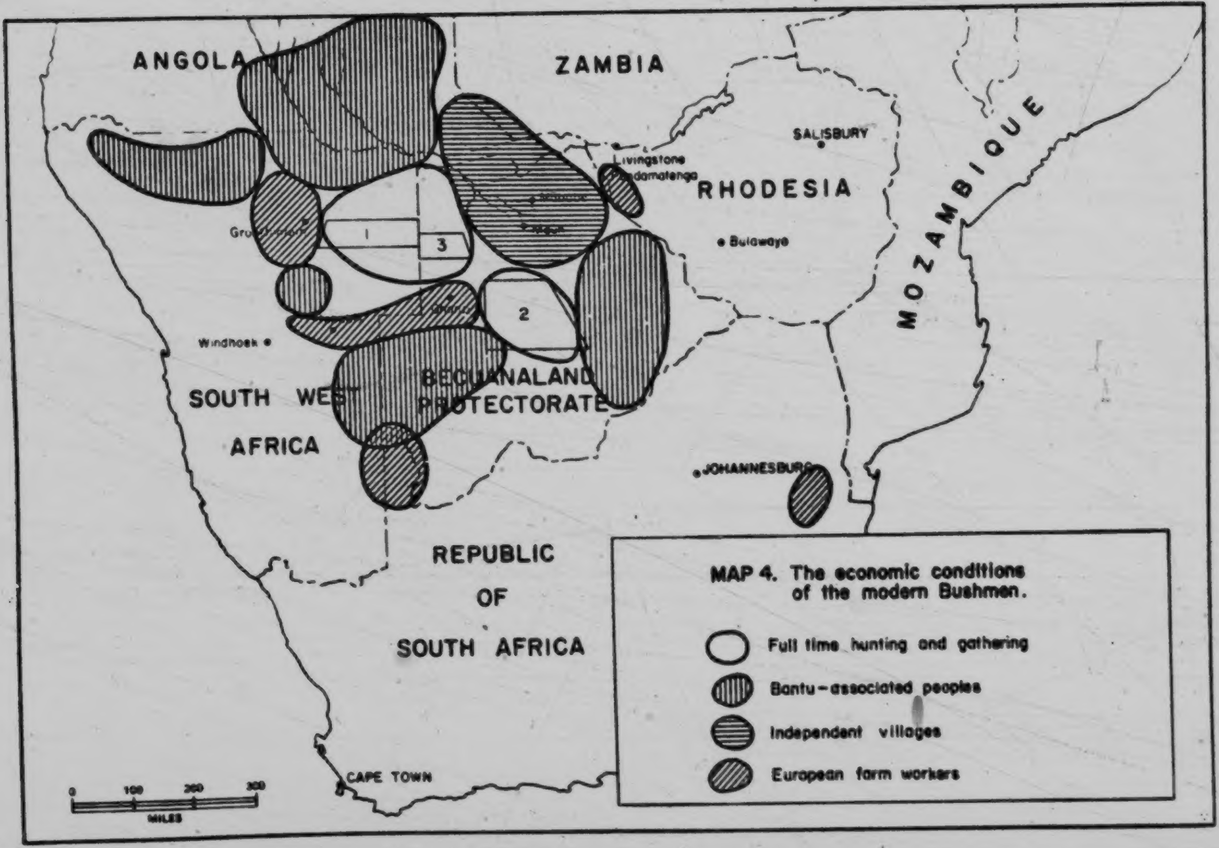
ANGOLA
ZAMBIA
SALISBURY
Livingstone
Pandamatenga
RHODESIA
MOZAMBIQUE
Grootfontein
1
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Bulawayo
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Windhoek
SOUTH WEST AFRICA
BECHUANALAND PROTECTORATE
JOHANNESBURG
REPUBLIC OF SOUTH AFRICA
CAPE TOWN
0
100
200
300
MILES
Full time hunting and gathering
Bantu-associated peoples
Independent villages
European farm workers

MAP 4. The economic conditions of the modern Bushmen.

The !Kung Bushmen

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162 The !Kung are the most numerous of the surviving Bushman tribes. Of the estimated total of 13,000, about 3,000 live in Angola, 2,000 in Bechuanaland, and 8,000 in South West Africa. The !Kung occupy a remarkably large area. Their country extends from north to south for a distance of 500 miles, and from east to west for a distance of 300 miles (see Map 5).

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19 Two criteria clearly distinguish the !Kung from all other Bushman peoples: their language and their unique system of personal naming. The !Kung language has phonological features in common with adjacent Tshu-khwe and Hottentot languages, such as the four click system and the strong glottal releases. However, the vocabulary and grammar of !Kung sets it apart from the other click languages. A lexicostatistic comparison of !Kung and Nharo showed a low incidence of cognates (11.5%).
[114] [193] The grammar of !Kung has yet to be adequately described, but none of the preliminary work by Doke (1925), Bleek (1929), Maingard (1957), and Westphal (1962, 1963:244) has been able to demonstrate a genetic relationship of !Kung grammar to the grammars of the other click languages.

There are no semi-!Kung languages (although the vocabulary of the southern dialect has been influenced by contact with Nharo) and therefore a native speaker of !Kung is immediately identified as a member of the !Kung tribe. This holds

19 true even at the periphery of their distribution where !Kung speakers have been intermarrying with other Bushmen for generations.

551 553 The second diagnostic criterion is the !Kung system of naming. There is a finite repertoire of about ninety personal names among the !Kung of Bechuanaland and South West Africa. All names are sex specific, about forty-five are for men and forty-five for women. Personal names are transmitted from grandparent to grandchild according to explicit rules of precedence. First-born males are named after their paternal grandfather and first-born females after their paternal grandmother. Subsequent offspring are named for the maternal grandparents and if necessary further children are named for the siblings of their parents, again with the paternal side taking precedence. The !Kung feel that all people bearing a certain personal name are ultimately descended from the original bearer of that name. Thus all men named, for example, ≠oma, feel a fictive kinship for one another. They formalize this by addressing all namesakes older than ego as grandfather (!un!a - literally "older name") and all namesakes younger than ego as grandson (!uma - literally "younger name"). By the extension of primary kinship terms to unrelated namesakes, some 9,000 !Kung Bushmen are actually or potentially incorporated into a fictive kinship network. This network extends from the Ghanzi farms on

551 553 the south to the Okavango River on the north. The !Kung name-relationship was first described by Lorna Marshall (1957:3ff) for the Bushmen at /Gauša Pan, South West Africa. It was found in 1964 that !Kung farm workers as far away as Gobabis, South West Africa, two hundred miles south of /Gauša, possessed the same repertoire of personal names, the same rules of name inheritance, and the same method for fictively linking unrelated individuals through the name relationship.

From the scanty evidence available on the Angola !Kung (Bleek 1928), it appears that the name relationship is not operative there. However, in Bechuanaland and South West Africa the presence of the institution is a reliable criterion for determining whether a Bushman is !Kung.[1]

101 131 162 There are three geographical divisions of the !Kung Bushmen. The northern group, numbering about 4,000, live in Angola and the far northern districts of South West Africa. The central group, numbering about 7,000, extend from the western margin of the Okavango Swamp in Bechuanaland as far as the farms of the Grootfontein district of South West Africa. [241] The southern group (c. 2,000) are confined to the farms of the

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[1] Unpublished evidence on the southern ≠hũa Bushmen indicates that they possess a system of fictive kinship based on personal names, but the repertoire of names appears to be entirely different from that of the !Kung Bushmen (Heinz, Westphal, personal communications).

101 Ghanzi and Gobabis Districts and their immediate northern
131 162 hinterland. All three divisions speak mutually intelligible
[241] dialects of !Kung but only the central and southern divisions
[197] have the institution of the name relationship.

[551] [184] The northern division peoples call themselves "!kũ"
101 meaning "people" (Bleek, 1928:106) and many ethnographers have adopted this as the general appelation for the tribe. There has been a bewildering variety of spellings of this name[1] and it is urgent that one standard form be chosen. It is recommended that !Kung be adopted as the standard appelation for the tribe, following the lead of Fourie (1928:83) and Marshall (1957, 1959, 1960, 1962, etc.). This is not the most phonetically accurate of the alternatives, but the controversy over spelling is an academic one because the majority of the "!Kung" do not recognize this as their tribal appelation at all!

The central division "!Kung" call themselves "zũ/wãsi" (zũ = "people"; /wã = "proper" or "true"; si = plural suffix). This translates as "the proper people" or "the true people". It also has the connotation of "just folks" which Elizabeth Marshall Thomas has appropriately rendered as "The Harmless People" (1959). Bushmen of the study area objected to the

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[1] At least fourteen different spellings are in the literature including: Kung, !Kũ, !Kun, Qhung, //Khun, ≠Kũng, Chũ, !kũ, !Khũ, :un, !Kung.

101 appelation "!Kung". They said it was a term of opprobrium used of them by the Bantu.

The southern division !Kung were the first of the tribe to appear in the ethnographic literature. They are described by Baines (1864) and Chapman (1868) as "Ma'kow'kow". Later workers have called them ≠Auin (Kaufmann 1910), //kau//en (Bleek 1928), ≠Ao-//ẽin (Fourie 1928), Makaukau, and Auen (Schapera 1930). All these forms appear to be corruptions of the name ≠d"au//ae, which is currently in use among the Bushmen of the Ghanzi District. This is the Nharo name for the !Kung Bushmen; it means literally "north side" and reflects the fact that the !Kung have traditionally been the northern neighbors of the Nharo. The !Kung commonly apply this label to themselves, saying "we are the ≠d"au//ae (north side) people".

[197] [184] Since all three groups, calling themselves !Kũ, žũ/wãsi, and ≠d"au//ae, respectively, speak dialects of the same language, and since the latter two groups maintain a sense of ethnic identity through the name relation it is recommended that the name !Kung be adopted as the tribal appelation. It is the easiest of the three names to pronounce and it has had the widest currency in the literature.

[184] [224] [222] Of the three geographical divisions of !Kung, full time independent hunters and gatherers are found only among the central group.

184 The northern !Kung of Angola and Ovamboland are closely
648 associated with Bantu agriculturalists. In 1925 Bleek ob-
222 served that "In contradistinction to the southern !Kũ the
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439 women and children (i.e. of the Angola !Kung) are not col-
lectors of wild food. Once or twice a year when certain berries ripen, the whole tribe goes out berry picking; otherwise they live by hunting and bartering part of the meat and skins obtained for the agricultural produce of their neighbors...." (1928:108). Westphal visited the Angola !Kung in 1964 and confirmed Bleek's observations (Westphal personal communication).

184 The southern division of !Kung work on the European
221
464 farms in the Ghanzi and Gobabis districts. Many of them
648 spend the summer months in the veld, hunting and gathering,
but return each year to winter on the farms (Silberbauer n.d.).

Among the central division of !Kung are found Bantu-associated peoples, farm laborers, and independent traditional hunters and gatherers. In the Grootfontein district of South West Africa several thousand central !Kung are working
131 on European farms. Along the Okavango river for 500 miles
184 of its length from Cuangar in the northwest to Sehitwa on
648 Lake Ngami, some further thousands of central !Kung live with,
and work for, the Bantu of the following tribes:

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648

Kuangari Bunja Sambiu Djiriku	in South West Africa
Mbukushu	in South West Africa and B. P.
Bayei Batawana Herero	in B. P.

[621] These !Kung may live in independent villages near a
[224] Bantu kraal and devote much of their time to hunting and
[222] gathering, or they may be incorporated into the compounds of
[464] their protectors and work as domestic servants and farm hands.
However, all of these Bantu-associated !Kung are in contact
131 with groups of more independent !Kung living inland. Ties
184 of real and fictive kinship and marriage link the river
602 dwelling !Kung with the !Kung of the dry interior. The loca-
582 tion of these non-!Kung peoples is shown in Map 6, p. 34.

131 Map 7 illustrates how the European and Bantu-associated !Kung form a ring of population around the peripheries of the northwest Kalahari. These settled areas enclose an interior of about 25,000 square miles, one third of which is in Bechuanaland and two thirds in South West Africa. Most of

131
131 this area is waterless and uninhabited. In the center is a
312 ring of pans and a series of waterholes which support at
133 present a population of 1,200 !Kung Bushmen. They occupy an
[162] area of about 3,500 square miles (70 miles from east to west
x 50 miles from north to south). This central complex of
water sources is surrounded by a belt of waterless, uninhabited
country that varies in width from sixty miles, on the east
and north, to over one hundred miles on the west and south.
Access to the interior is limited. One line of wells links
Tsumkwe in the interior with Grootfontein on the west.

[491] Two rarely used motor tracks join the interior with the
Okavango swamp to the east. A police patrol road cut in
1954-55 runs from south to north along the B.P./S.W.A. border.
The maximum vehicle speed obtainable on these tracks is 20 mph
[177] and trucks pass through about once a month. The difficulty
of the terrain, the lack of farming potential, and the scarcity
of water have deterred European and Bantu penetration of the
area.

[114] The distinction between periphery and interior has been applied to the country of the central !Kung by John Marshall (1957) and Lorna Marshall (1960:327ff). The present usage differs from that of the Marshalls. They applied the term "interior" to the Nyae Nyae ring of pans and regarded the waterholes at /"ai/"ai, /Gam, and !angwa as peripheral. Since

131 133 312 619 Since the Nyae Nyae peoples are closely linked genealogically to the peoples of /"ai/"ai, /Gam, and !angwa, and since their several territories are surrounded by an uninhabited belt 60-100 miles in width, it seems more useful to include all the central water sources under the term "interior" and consider all the other river dwelling and farm !Kung as peripheral (see Map 7, p. 37).

121 184 433 This description of the subsistence ecology of !Kung Bushmen therefore concerns the interior !Kung of the central dialect division. It is not to be taken as representative of the !Kung in general, the great majority of whom are today living on European farms or working closely with Bantu.[1] It was pointed out in Chapter I that the selection of a study site was dictated by the necessity of finding a Bushman population living traditionally and independently. It was realized at the outset that such a population was not typical of the majority of !Kung.

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[1] A further stricture must be applied to the !Kung of the interior. In 1960 a Government Station was built at Tsumkwe, S.W.A. Since then the 800 interior !Kung on the South West African side of the border have settled there and are receiving instruction in agriculture. The 400 !Kung on the Bechuanaland side of the border have not been permitted to participate in this program. Therefore, during the period of the present study, only the interior !Kung in Bechuanaland were leading a year-round hunting and gathering way of life.

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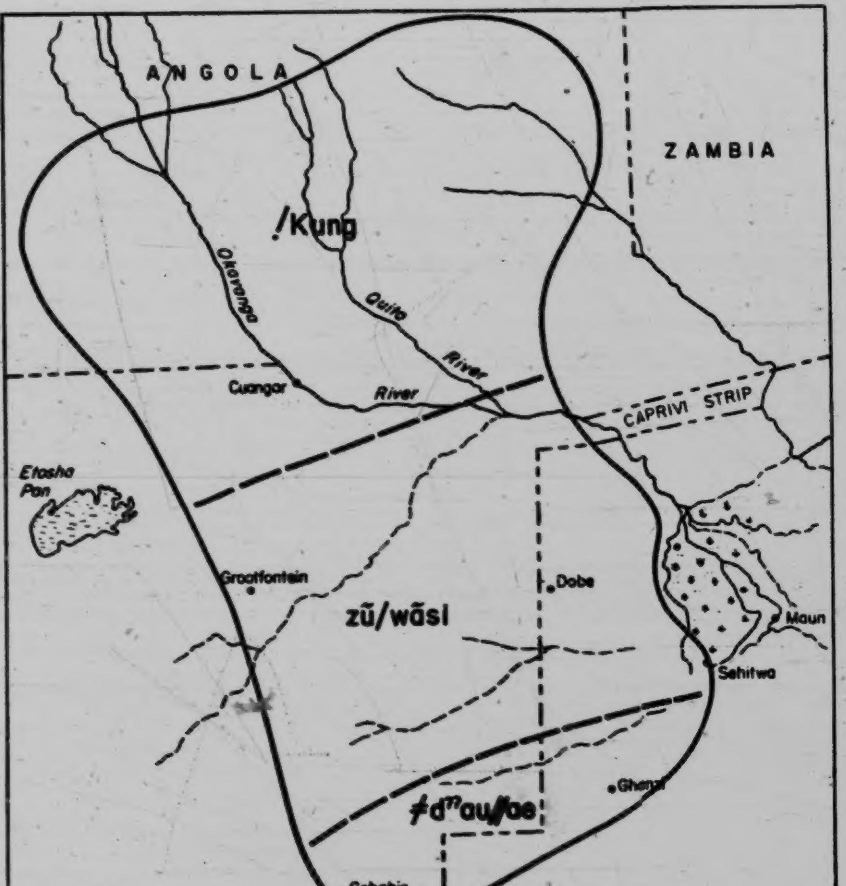
ANGOLA
ZAMBIA
/Kung
Okavango
Quito
River
Cuangar
River
CAPRIVI STRIP
Etosha Pan
Grootfontein
zũ/wãsi
Dobe
Maun
Sehitwa
Ghanzi
≠dⁿau//ae
Gobabis
Windhoek
BECHUANALAND
SOUTH WEST AFRICA
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MAP 5. The three dialect divisions of /Kung.

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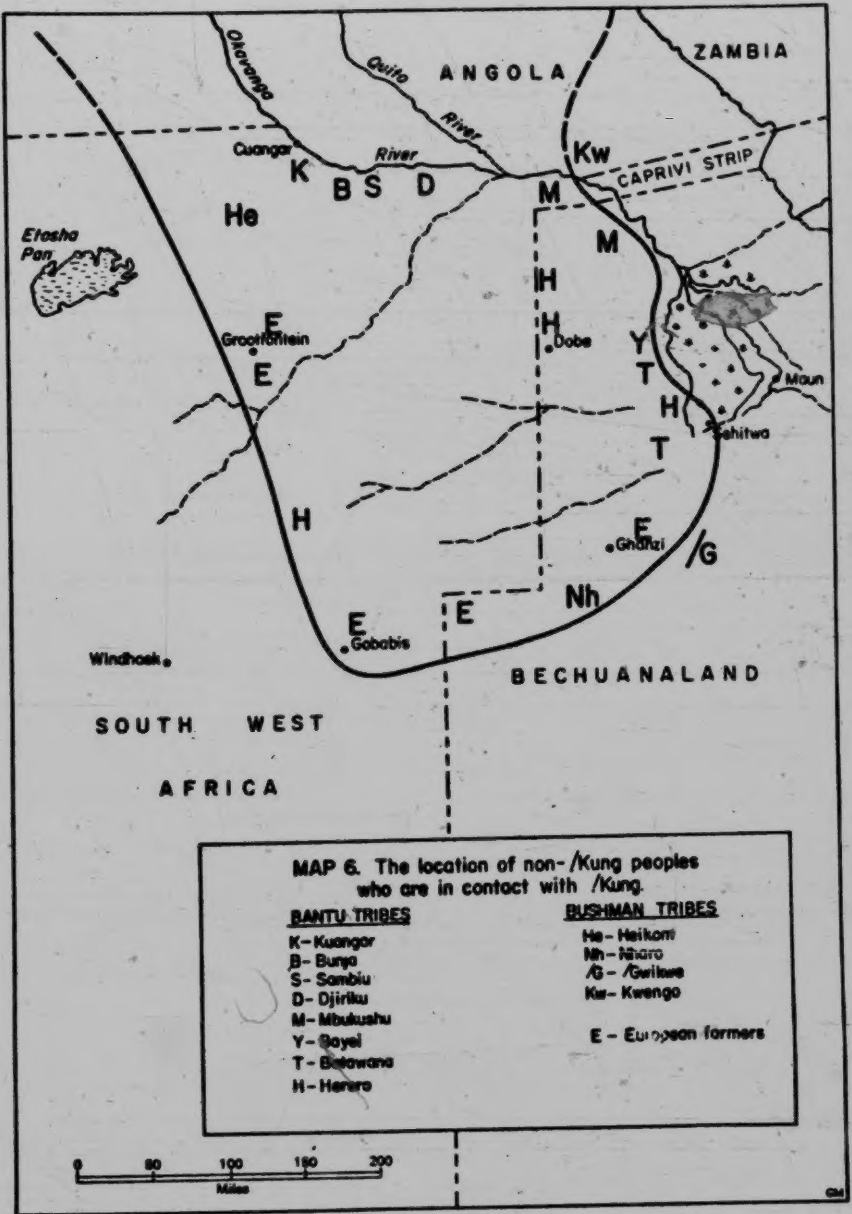
MAP 6. The location of non-/Kung peoples who are in contact with /Kung.

ANGOLA
ZAMBIA
Okavango
Cuito River
Cuangar
River
CAPRIVI STRIP
Kw
K
B S D
M
M
He
Etosha Pan
H
H
Dobe
Y
T
H
T
Maun
Sehitwa
E
Grootfontein
E
H
E
Ghanzi
/G
Nh
E
E
Gobabis
Windhoek
BECHUANALAND
SOUTH WEST
AFRICA
BANTU TRIBES
K- Kuangar
B- Bunya
S- Sambiu
D- Djiriku
M- Mbukushu
Y- Bayei
T- Batawana
H- Herero
BUSHMAN TRIBES
He- Heikom
Nh- Naro
/G- /Gwikwe
Kw- Kwengo
E - European farmers
0
50
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Miles

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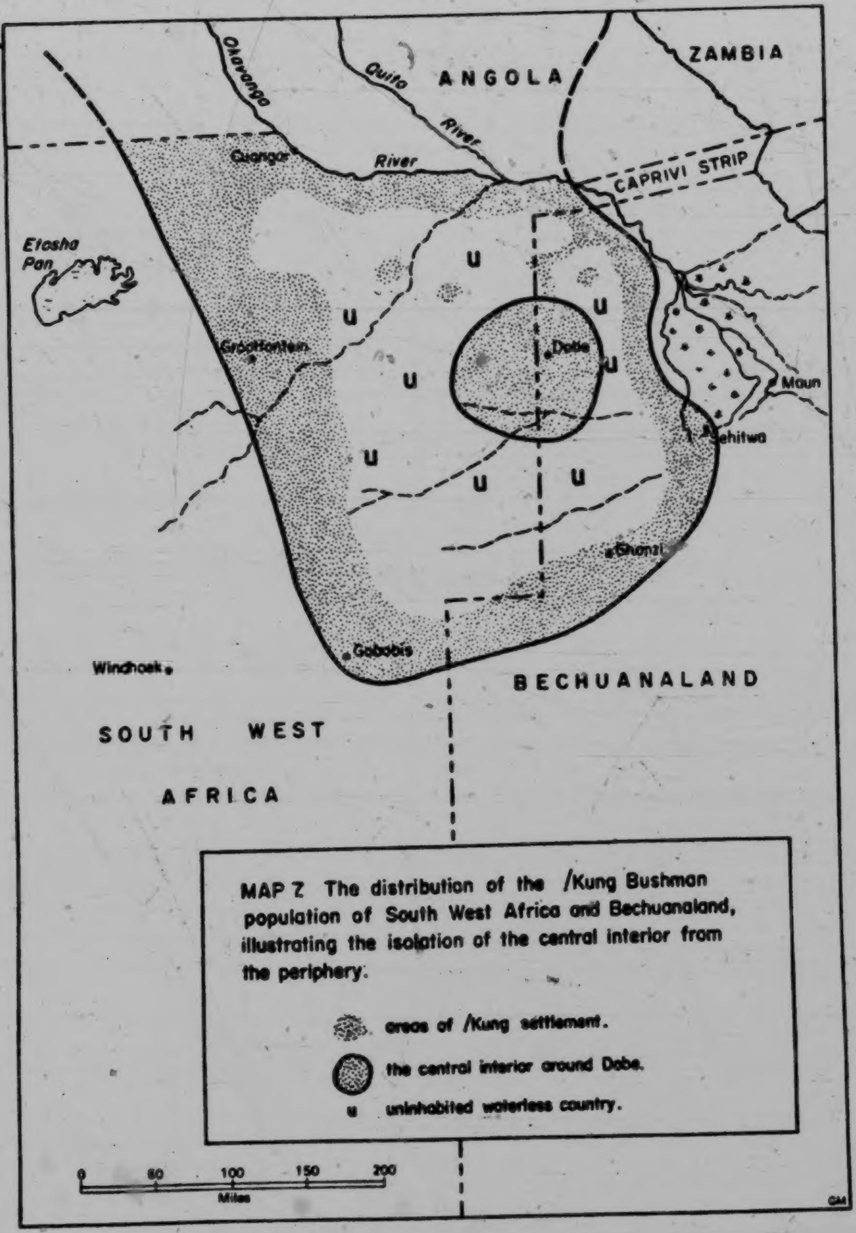

ANGOLA
ZAMBIA
Okavango
Quito River
River
Quangar
CAPRIVI STRIP
Etosha Pan
U
Grootfontein
Dobe
Maun
Sehitwa
Ghanzi
Gobabis
Windhoek
BECHUANALAND
SOUTH WEST AFRICA
0 50 100 150 200
Miles
GM

MAP 7 The distribution of the /Kung Bushman population of South West Africa and Bechuanaland, illustrating the isolation of the central interior from the periphery.

▨ areas of /Kung settlement.

● the central interior around Dobe.

u uninhabited waterless country.

III. THE DOBE AREA: ITS PEOPLES AND HISTORY

131 [114] Dobe, a small waterhole on the South West Africa/Bechuanaland border, ninety miles west of Nokaneng, B.P., was the location of the author's main field camp. The term, "Dobe area", as used in this report refers to the country [312] within a thirty mile radius of the Dobe well. This includes the eleven permanent waterholes which support the entire population of Bushmen and Bantu in the Bechuanaland sector [224] of the !Kung interior. The Dobe area also includes a large [222] tract of ground in South West Africa where Bechuanaland Bushmen traditionally go to hunt and gather. It does not include the Nyae Nyae pans, /gam and Tsumkwe in South West Africa, or the more distant waterholes at n!aun!au, at !audum, or at Tsodilo Hills in Bechuanaland (see Map 8).

Dobe is not the cultural or administrative center of the settlements of the interior !Kung. On the contrary, Dobe is the most isolated of the waterholes on the Bechuanaland side. The term "Dobe area" is applied here simply as a matter of convenience.

To reach the Dobe area by truck, one drives west from the Batawana town of Nokaneng which is situated on the western edge of the Okavango swamps. After traversing uninhabited country for 67 miles the traveller arrives at

131 [133] !goše, the first waterhole of the area. Continuing southwest from !goše the motor track parallels the course of a dry river bed called the !angwadum for 23 miles until it meets 131 312 the South West Africa border track. Along this route from !goše to the border one passes the waterholes of Kamburungu, !angwa matse, !angwa, Bate, Kathikona, Mahopa, !Kabe, and !thai. Each of these wells supports Bushman groups and Bantu cattle posts. Following the border track north from its intersection with the !angwadum one can reach Dobe which supports a resident population of Bushmen but no Bantu. [133] Turning south from the intersection, one crosses the low ranges of the Aha Hills which are usually uninhabited and arrives after 25 miles at /ai/ai, a large waterhole with over one hundred Bushmen.

131 361 All these centers of habitation lie to the east and south of Dobe. To the north, the nearest settlement is n!aun!au at a distance of 40 miles and, to the west, the nearest settlement is Tsumkwe, 35 miles away (see Map 8).

131 312 [161] Eight naturally occurring waterholes support the bulk of the Dobe area population which in November, 1964, stood at 763 people. There were 433 Bushmen residents, all but one [563] of them members of the !Kung tribe. There were 340 Bantu, eighty-five percent of whom were of the Herero tribe. The remaining Bantu were Batawana, Mbukushu and Bayei.

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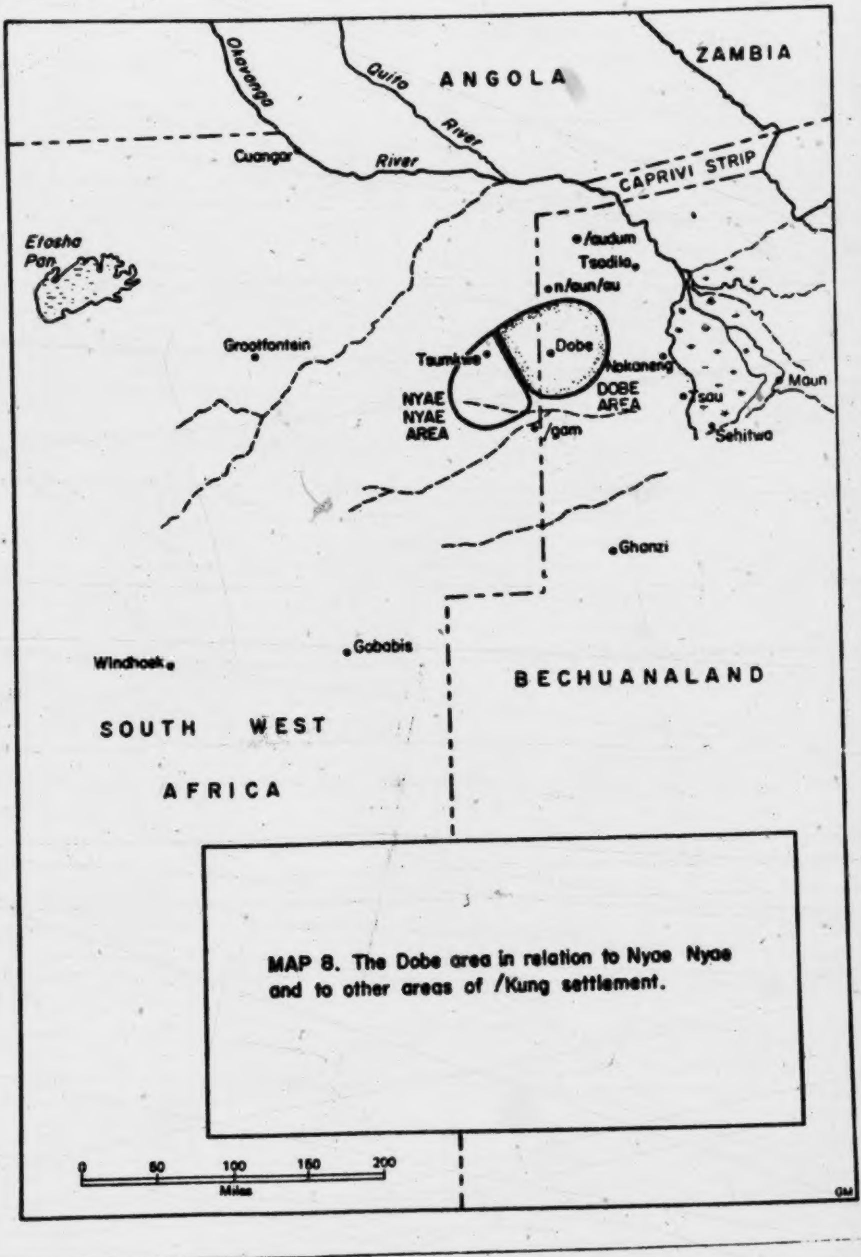
ANGOLA
ZAMBIA
Okavango
Quito River
Cuangar
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CAPRIVI STRIP
Etosha Pan
/audum
Tsodilo
n/aun/au
Dobe
Tsumkwe
Grootfontein
Nokaneng
DOBE AREA
NYAE NYAE AREA
Maun
Tsau
Sehitwa
/gam
Ghanzi
Gobabis
Windhoek
BECHUANALAND
SOUTH WEST AFRICA
0
50
100
150
200
Miles
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MAP 8. The Dobe area in relation to Nyae Nyae and to other areas of /Kung settlement.

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563 The waterholes and their respective Bushman and Bantu populations are listed in Table 2.

!Kung group structure

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166 The definition of the !Kung living arrangements presented the most difficult problem of the field study. The !Kung were found to be living most frequently in camps that numbered from ten to thirty individuals. But the composition of these camps changed from month to month and from day to day.

The task of defining the stable membership units was complicated by the following factors:

1. the frequent shifts of individuals and families from one camp to another,
[574] 2. the high incidence of visiting between camps,
3. the presence of long-term visitors from outside the Dobe area,
4. the Dobe area residents who were living elsewhere on extended visits, and
[563] 5. the intermarriage and co-residence of Bushmen with Bantu.

These complications are in addition to the routine changes in group structure brought about by births, deaths, post-marital residence, and the seasonal subsistence cycle.

It became evident that flexibility is the basic premise [121] of !Kung group structure. It would therefore be inappropriate to try to impose a formal model of organization on the data,

[TEXT CONTINUED ON PAGE 44]

TABLE 2

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The Numbers and Distribution of the Bushman and Bantu Populations of the Dobe Area

Name of Waterhole and Location	Population Bushman	 Bantu
1. !gose -- 23 miles east of Dobe	62	18
2. !angwa -- 13 miles east of Dobe	36	49
3. Bate -- 12 miles southeast of Dobe	45	21
4. Mahopa -- 7 miles east of Dobe	42	65
5. !Kabe -- 3 miles east of Dobe	8	12
6. !ubi -- 5 miles south of Dobe	52	65
7. /ai/ai -- 27 miles south of Dobe	109	67
8. Dobe	36	--
Three other wells, dug in recent years by the Bantu, support the remainder of the population:		
9. Kathikona -- 10 miles east of Dobe	1	8
10. !angwamatse -- 17 miles east of Dobe	9	23
11. Kamburunqu -- 19 miles east of Dobe	1	12
TOTALS	401[1]	340

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[1] The total of 433 is arrived at by the addition of 32 !Kung who were outside the Dobe area at the time of the census.

621
166 such as the patrilineal band or composite band models current
121 in the literature (Steward 1955, Sahlins 1959, Service 1962).

121 An account of the situation at one waterhole will serve
621 312 to illustrate some of the dynamic processes at work in !Kung
621 group structure. At Dobe in October, 1963, there were two
312 camps, one with 28 members, the other with ten members. In
166 162 December, 18 members of the larger camp left on an extended
161 visit to Tsumkwe and the remaining ten people made a joint
camp with the smaller group to form a camp of twenty people. In January, 1964, these two segments split up and abandoned Dobe altogether. The waterhole remained unoccupied until May, 1964, when the two segments recombined and were joined by 22 other people, who came in from five other camps. This group of 42 people wintered at Dobe in one camp. Then, in August the camp split up into a camp of twelve and a camp of 24. Six of the 22 people who had wintered at Dobe returned to other camps while 16 of these people remained at Dobe. The two Dobe camps (of twelve and 24) remained approximately stable for the remainder of the study (i.e. until January, 1965).

621 Thus at different times of the year the population of
312 Dobe was counted as follows:
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October 1963	38 people in 2 camps
December 1963	20 people in 1 camp
Jan.-April 1964	nil.
May 1964	42 people in 1 camp
Aug. 1964 to Jan. 1965	36 people in 2 camps

621
312 Similar variations in group structure were observed at all the waterholes of the Dobe area. However, despite these shifts in the size and composition of camps there were two lines of evidence that indicated stability. First, there was a generally acknowledged nucleus of permanent territorial residents at each waterhole. Second, when camps split up they did so consistently along the same lines of fission. The presence of these two regularities provides a basis for a preliminary account of the living arrangements of !Kung Bushmen. The complete documentation and analysis of group structure will be presented in a later paper.

[125] The starting point for this account is a single complete census of the Dobe area made by the author in November, 1964. This was a good time for a census because it is the period of [221] the year when the camps are most stable. It was the end of the dry season when most of the Bushmen were restricted to their permanent waterholes.

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162 This census showed a total population of 433 Bushmen divided among 35 living units. This figure of 433 includes ten individuals who died in the year preceding the census, and 32 others who were away from the area at the time of the census, so that the total number of Bushmen who were actually physically present in the area in November, 1964, was 391. The majority of the people (311 individuals, 72% of the total) were living in 15 independent hunting and gathering bands.

621 161 162 [262] The remaining 122 individuals were living with the Bantu. The diet of these latter people consisted of a combination of Bushmen wild foods and the products of the Bantu cattle. The complete census of the 35 living units is shown in Table 3.

The 15 bands ranged in size from nine to 52 individuals. There were five small bands (of 9, 12, 12, 12, and 13 members), nine bands of intermediate size (of 17, 19, 19, 21, 22, 22, 24, 27, and 30), and one large band with 52 members. The average band had 20.7 members and the median band had 19 members. The presence of twin modes in band size (at 12 and 22 members respectively) is perhaps a function of the domestic cycle,[1] but its significance remains to be explained.

621 Each of the bands has a nucleus of individuals who have a territorial claim to the land they occupy and who tend to spend the greater part of the year in residence in their territory. These core individuals are usually old people whose descendents and their spouses make up the bulk of the [602] band's membership. Each of the larger bands has among its members one or more families who are collaterally or affinally related to the core individuals. These collaterals and affines do not express as strong a territorial claim to the band's land as do the core individuals and they tend to move around more frequently than do the core individuals. As

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[1] I am indebted to Adam Kuper for this suggestion (personal communication).

[TEXT CONTINUED ON PAGE 48]

TABLE 3

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Census Breakdown of the 433 Dobe Area Bushmen, by Sex, Age, and Living Unit **Note: Independent Bands are Marked (B).**

No.	Place	Name	Adults M	Adults F	Children M	Children F	TOTAL M	TOTAL F	TOTAL T
1.	Dobe(B)	n≠eysi	5	7	0	0	5	7	12
2.	Dobe(B)	≠qma//gwe	7	6	5	6	12	12	24
3.	!xabe	Enamiti	3	5	0	0	3	5	8
4.	Mahopa	Enamoharadi	5	10	5	6	10	16	26
5.	Mahopa	Rotsa	3	5	0	1	3	6	9
6.	Mahopa	Kathikona	1	0	0	0	1	-	1
7.	Mahopa	Vethepa	1	-	-	-	1	-	1
8.	Mahopa	Yona	2	2	1	1	3	3	6
9.	!angwa	Isak	4	5	1	3	5	8	13
10.	!angwa(B)	bo	7	7	3	5	10	12	22
11.	!angwa	Noiye	1	2	1	-	2	2	4
12.	!angwa	Kangwadyata	2	1	1	1	3	2	5
13.	!angwa	Kamburungu	-	1	-	-	-	1	1
14.	!angwa	Vetetha	1	-	-	-	1	-	1
15.	Bate(B)	!xoma	7	8	3	3	10	11	21
16.	Bate	Liceku	5	5	1	1	6	6	12
17.	Bate	Kaku·una	2	2	1	1	3	3	6
18.	Bate	Kathedi (Mahura)	2	2	1	1	3	3	6
19.	!ubi(B)	Kamburu	11	20	13	8	24	28	52
20.	!goše(B)	/ise	7	9	1	5	8	14	22
21.	!goše(B)	/i!ay	6	5	1	-	7	5	12
22.	!goše(B)	bo	4	7	3	5	7	12	19
23.	!goše	IBatha	1	1	2	1	3	2	5
24.	!goše	Tubexo	1	1	2	-	3	1	4
25.	Nokaneng(B)	Kau≠dwa	5	6	-	2	5	8	13
26.	!gausa(B)	n≠isa	5	5	6	3	11	8	19
27.	/ai/ai(B)	//aun!a	3	5	1	3	4	8	12
28.	/ai/ai(B)	//aihan!a	2	3	1	3	3	6	9
29.	/ai/ai	Halingisi	3	5	1	1	4	6	10
30.	/ai/ai(B)	≠oma!xwa	11	12	4	3	15	15	30
31.	/ai/ai(B)	!Kum	4	6	2	5	6	11	17
32.	/ai/ai(B)	≠omažho	8	9	4	6	12	15	27
33.	/ai/ai	dumn!a	1	-	-	-	1	-	1
34.	/ai/ai	Kamakau	1	1	-	-	1	1	2
35.	/ai/ai	Kuramehe	-	1	-	-	-	1	1
Totals			131	164	64	74	195	238	433

621 territoriality and band membership are closely linked they will be discussed together in Chapter VII.

621 312 16 A note on the history of each waterhole during the period 1963-64 will serve to illustrate some dynamic features of group structure.

1. !goše - There were three bands living at this waterhole at the time of the census, numbering 12, 19, and 22 individuals, respectively. These three bands had lived in one large camp from 1961-64. In mid-1964, they split into four bands. One group of 13 went to Nokaneng on an extended visit. The other three bands, totalling 53 people, remained at !gose. The territorial nucleus of the three bands that remained consisted of the descendents of one very old woman and her three nephews.

2. !anqwa - One band of 22 individuals was living here. The nucleus of this group included again a very old woman, her daughter and her son. Most of the members of the group were siblings of the daughter's husband. This band made a common camp with the members of the Batawana headman's staff. In July, 1964, they set up an independent camp.

3. Bate - One band of 21 members was living here. The nucleus consisted of two old women who were sisters and the two married offspring of these sisters. The remainder of the band consisted of affines of the sisters' children. In

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late 1964, this entire band left Bate and shifted to !Xabe, a waterhole about seven miles away.

4. Mahopa - In 1964, there were no bands at this waterhole although some 43 Bushmen lived here in Bantu villages.

5. !Xabe - No band had lived here for several years until the group arrived from Bate.

6. !ubi - One band of 52 members was living here. The nucleus consisted of an old man and his two sisters. The old man and 31 other members of this band alternate yearly between Tsumkwe, South West Africa, and !ubi, Bechuanaland. They appeared to be in the process of shifting permanently out of the Dobe area. The two sisters and 18 other people continued to live at !ubi.

7. /ai/ai - In November, 1964, there were five bands here with 9, 12, 17, 27, and 30 members, respectively. Each band has a nucleus of an old man or woman and their married offspring. In October, 1963, most of these people were living in one large camp of 83 members. In 1964, this camp broke up into six smaller groups. One group went south to /gam and five groups remained. In addition, a number of people came from /gam to live at /ai/ai, thus producing the present situation of five camps totalling 95 individuals.

8. Dobe - There were two bands here of 12 and 24 people, respectively. The territorial nucleus consisted of

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16 an old man and his sister. When the two Dobe groups divided, the old man and his two married children went one way and the old woman and her three sons went the other.

The remaining two bands were living outside of the Dobe area at the time of the census. One of them was the band of 13 from !goše that had gone to Nokaneng. The other was a group of 19 individuals who came from South West Africa to spend the summer of 1963-64 in the Dobe area and had returned to Tsumkwe in May, 1964.

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166 These brief notes indicate the extent to which bands coalesce and split, change waterholes and move in and out of the Dobe area. It does not take into account the corresponding 621 shifts made by individuals and families. In light of the above it is doubtful whether the use of the term "band" is legitimate in the context of Bushman group dynamics. The "band" may turn out to be an artifact of the observer's sampling technique and his theoretical preconceptions (see Chapter VII). Among the !Kung, for example, it appears that the cohesive social units are the extended families that make up the larger aggregations that have been called bands. This does not imply that the !Kung have what Steward (1955) called a "family level of organization" since the !Kung consistently live in aggregations of two to ten or more families. Until a complete analysis of the data is carried out, it would

621 seem more appropriate to use the non-committal term "camp" and discard the term "band".[1]

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162 Apart from the fifteen independent camps, there were 122 !Kung Bushmen living with the Bantu. Thirteen Bush women were married to Bantu men.[2] Five of these women had borne a total of nine children who were being raised as members of their fathers' tribes and are therefore not enumerated in the Bushman census. Some of the women had brought members of their families to live at their husbands' kraals. Twenty-eight of the !Kung Bushmen were living with their Bantu in-laws. In all, the wives of Bantu and their kinsmen account for 39 of the 122 !Kung living with Bantu. There were no cases of a Bantu girl marrying a !Kung man.

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233 Some families of Bushmen live with and work for Bantu families. Five young married men were working as cattle herders. They brought their wives and children to live with them. In addition, seven unmarried !Kung boys were working on cattle and were living in the compounds of their employers. Several old couples and a widower, who were temporarily not

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[1] This follows the lead of James Woodburn, who in his analysis of Hadza group structure (1964) discards the term "band".

[2] One of the thirteen had actually married a N/hai Bushman (the only non-!Kung Bushman in the Dobe area). This man was culturally identified with the Bantu.

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464 attached to an independent camp were living with the Bantu.
[233] [162] These working Bushmen, with their spouses and families,
numbered 44 people.

The Batawana headman, Isak Utuhile, was the only one of
the Bantu residents to maintain a staff of retainers and
their families. This sort of benevolent feudalism is a common
practice throughout the Tswana tribal areas of Bechuanaland
(Schapera 1953:28; Tagart 1933) but, with this one exception,
[162] is absent in the Dobe area. The headman supports four assis-
tants (including a uniformed Bushman police constable) and
their families, a total of 13 people.

Finally there was an Ad Hoc grouping of 26 !Kung who
lived at the kraal of Enamoharadi, a Herero woman at Mahopa.
These people lacked a territorial nucleus and therefore could
[224] not be considered as an independent camp. Several !Kung
[222] women helped with the domestic duties but the majority chose
[262] to use Mahopa as a base of operations for hunting and
gathering and to drink the milk of Enamoharadi's cattle when
it was offered to them.

361 Except for the women who are married to Bantu, most of
648 the !Kung remain only temporarily in Bantu villages, for
periods ranging from one month to two years. Also it was
observed that most of the !Kung living with Bantu spent at
least half the year hunting and gathering. Furthermore many

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648 of the !Kung who were independent at the time of the census had a history of living with Bantu for periods in the past.

It is difficult to determine to what extent the !Kung living arrangements have been affected by the Bantu presence, beyond stating the obvious facts, that, until the Bantu came, there could be no intermarriage and no opportunities for employment. At this stage of analysis, it would certainly be premature to attribute the fluidity of band membership to the effects of contact, since there is good evidence that this flexibility is adaptive in the context of traditional subsistence patterns (see Chapters VII and VIII).

A history of contact

127 This historical sketch of the period 1879-1965 is based on the testimony of informants resident in the Dobe area. Since none of the Bushmen and very few of the Bantu had any knowledge of the dates of historical events, these were provided by discussions with the British administration at Maun and by a survey of the early literature on the area.

173 The pre-contact period - There is no evidence in their
oral tradition that the !Kung of the interior have migrated
there from elsewhere. This corroborates the !Kung belief
quoted by Lorna Marshall that "they have lived in the Nyae
[174] Nyae area since time began" (1960:325). The interior !Kung
cannot, by their own account, be considered to be recent refugees from more favorable habitats.

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439 The interior !Kung have had trading relations with Bantu
[411] peoples on their periphery for over eighty years. The evidence
[415] for this is the presence of iron-tipped weapons, pottery and
[276] tobacco. The present-day !Kung have no knowledge of iron-
working or pottery-making and they do not raise tobacco. The
old people state that their grandfathers had these things
[173] before the first non-Bushmen came to the interior. Men in
[411] their 60's and 70's today can remember their grandfathers
telling them that they began hunting with bone arrows and did
not obtain iron for arrows until they were well into adult
[411] life. The making of bone arrow heads is still common know-
[321] ledge today but, as there is an abundant supply of iron fencing
[325] wire, none of the men hunt with bone. The art of chipping
[178] flint is not known in the Dobe area. It is probable that
[324] these Bantu goods (and also some European goods such as beads
and buttons) reached the interior through Bushman trading
intermediaries some years before the arrival of the first
Bantu and Europeans.

173 Early contacts, 1879-1925 - There is disagreement among
the !Kung about whether the Europeans or the Bantu were the
first to penetrate the interior. Apparently the first pene-
175 trations occurred during the period 1875-1890. Hendrik Van
648 Zyl, a professional hunter, is the first European known to
have reached the interior (Silberbauer 1965:114-115). In the

[TEXT CONTINUED ON PAGE 56/67]

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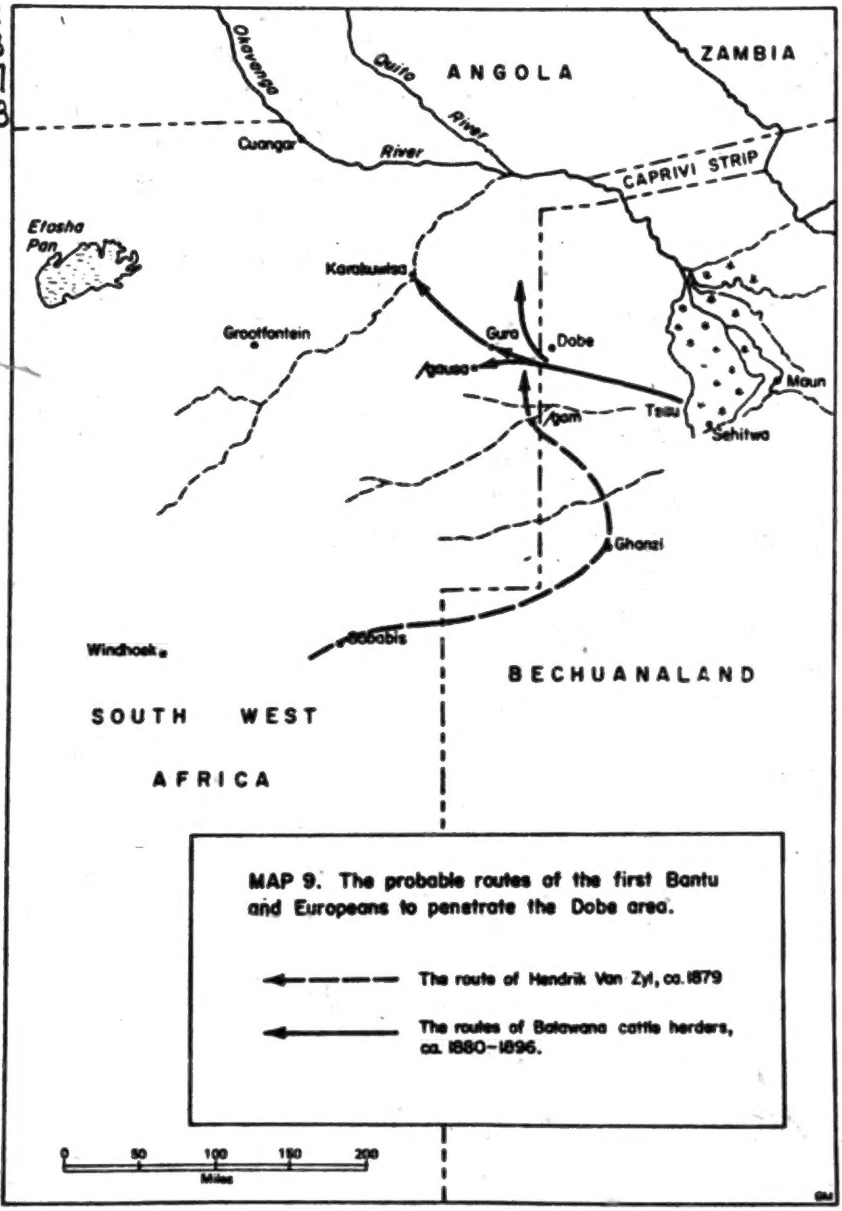
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ZAMBIA
Okavango
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River
CAPRIVI STRIP
Etosha Pan
Karakuwisa
Grootfontein
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Windhoek
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MAP 9. The probable routes of the first Bantu and Europeans to penetrate the Dobe area.

← — — — The route of Hendrik Van Zyl, ca. 1879

←—— The routes of Batawana cattle herders, ca. 1880-1896.

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648 late 1870's, Van Zyl was hunting elephant and rhinoceros in the Ghanzi District. In 1879, he camped at /gam and is known [563] to have visited /ai/ai and !ubi. One of the white hunters with Van Zyl had an affair with a !Kung woman named n/ahka; the descendents of this union are today living at !ubi. These people acknowledge their European ancestry but otherwise are culturally !Kung.

During roughly the same period, the Batawana cattle herders from the Tsau area on the Okavango swamps began to move their cattle out to summer waterholes in the west. By the 1890's, they had penetrated as far west as Karakuwisa in what was then German South West Africa. They had also established cattle posts at /ai/ai, Gura, and at /gauša Pan (see Map 9).

The Rinderpest epidemic of 1896-7, is an historical landmark throughout the stock raising areas of southern Africa. At the time of the outbreak only two Batawana families were summering their herds of cattle in the interior. The Ramadjagote family was at /Gauša Pan and the Ledimo family was at Gura. The Rinderpest devastated the herds on the Okavango but fortunately did not reach the central !Kung interior. When the two families drove their cattle back to the river after the epidemic had passed, it was found that theirs were the only herds left intact in western Ngamiland.

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The Ramadjagote and Ledimo families owe their present preeminent position in Batawana tribal affairs to that stroke of fortune, because in exchange for the use of their breeding stock the two families were granted by the tribe two vast tracts of land west of the Okavango swamps.

The Ledimo family received rights to hunt, to graze their cattle and to collect tribute over all the lands that lay west of the swamps and north of the Aha Hills. The Ramadajagote family received a similar concession over the lands that lay south of the Aha Hills (see Map 10). Both families have exercised these rights in Western Ngamiland until recent years and one of the senior Ledimos still maintains a cattle post at n!aun!au. However, in 1965, with the election of the first democratic government in Bechuanaland, these and other traditional concessions are being abolished.

It should be added that although the British declared a protectorate over Bechuanaland in 1896 (Sillery 1952:60ff), their official presence was not felt in the Dobe area until many years later. In 1934, Captain Webb of the Bechuanaland Police made the first official tour of duty to !angwa and /ai/ai.

The next historical event to affect the !Kung of the interior was the Herero-German War of 1904-07. In 1904, the Hereros of South West Africa rose in rebellion against a

[TEXT CONTINUED ON PAGE 60/61]

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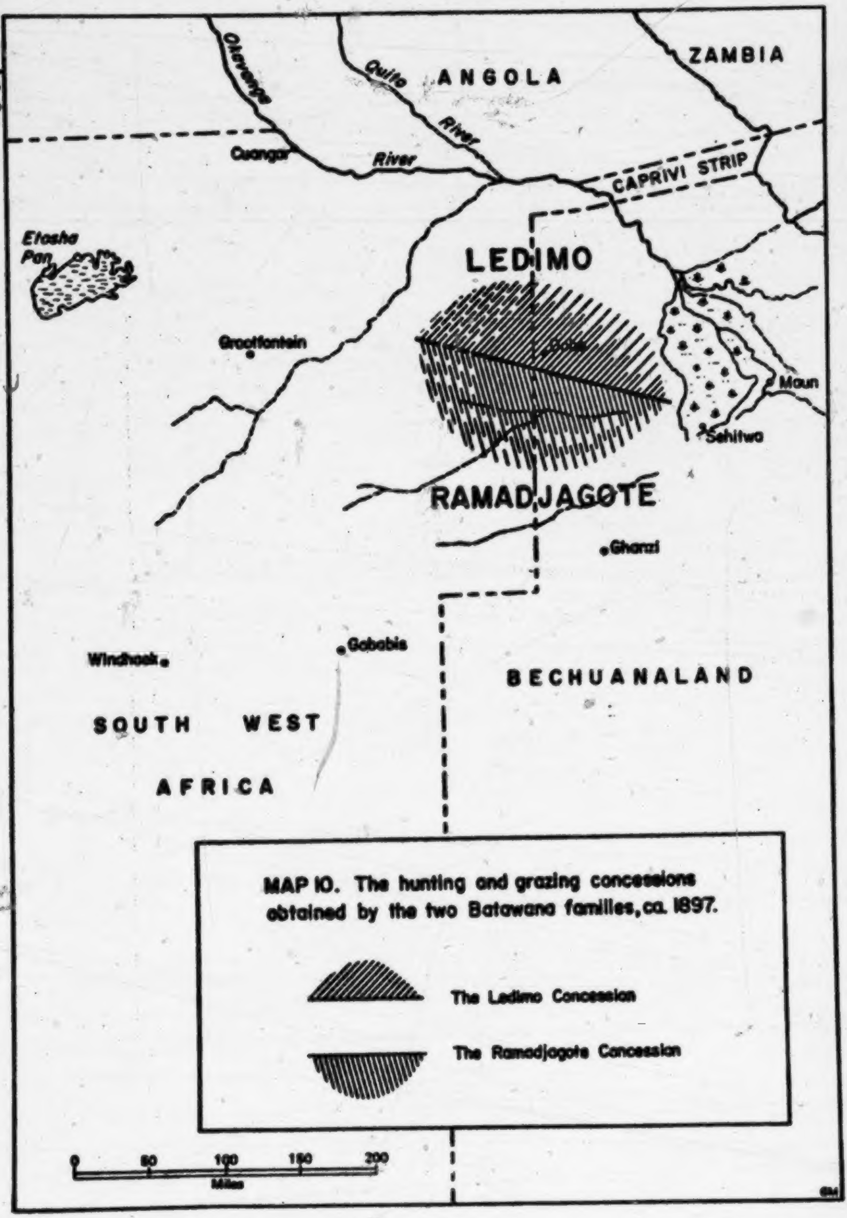
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Quito River
ANGOLA
ZAMBIA
Cuangar
River
CAPRIVI STRIP
Etosha Pan
LEDIMO
Grootfontein
Gobe
Maun
Sehitwa
RAMADJAGOTE
Gharzi
Gobabis
Windhoek
BECHUANALAND
SOUTH WEST AFRICA
The Ledimo Concession
The Ramadjagote Concession
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MAP 10. The hunting and grazing concessions obtained by the two Batawana families, ca. 1897.

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cruel German administration. The Germans launched a genocidal campaign against the Hereros and succeeded in exterminating the majority of the tribe.[1] Several thousand Hereros, fleeing before the German patrols managed to escape east to Bechuanaland where the British government granted them asylum. Many of these refugees passed through the Dobe area on their way to safety and the details of their flight are remembered today by the older !Kung. One German patrol pursued the refugees as far as Gura, a well situated 30 miles west of Dobe, where they found an abandoned Batawana cattle post. Thinking that they had reached the frontier of British territory, they turned back, but before doing so, they carved a boundary marker on a baobab tree, which may still be seen today (see Map 11).

At the time of the rebellion none of the refugees had settled in the Dobe area. They all continued on to the Batawana villages on the swamps where they were given breeding stock and allowed to resume a normal life. Until the mid-1920's, the only non-Bushman presence in the interior was the annual summer hunting trips led by the Ramadjagote and Ledimo families.

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[1] The ghastly details are found in the Union of South Africa's official inquiry (1918).

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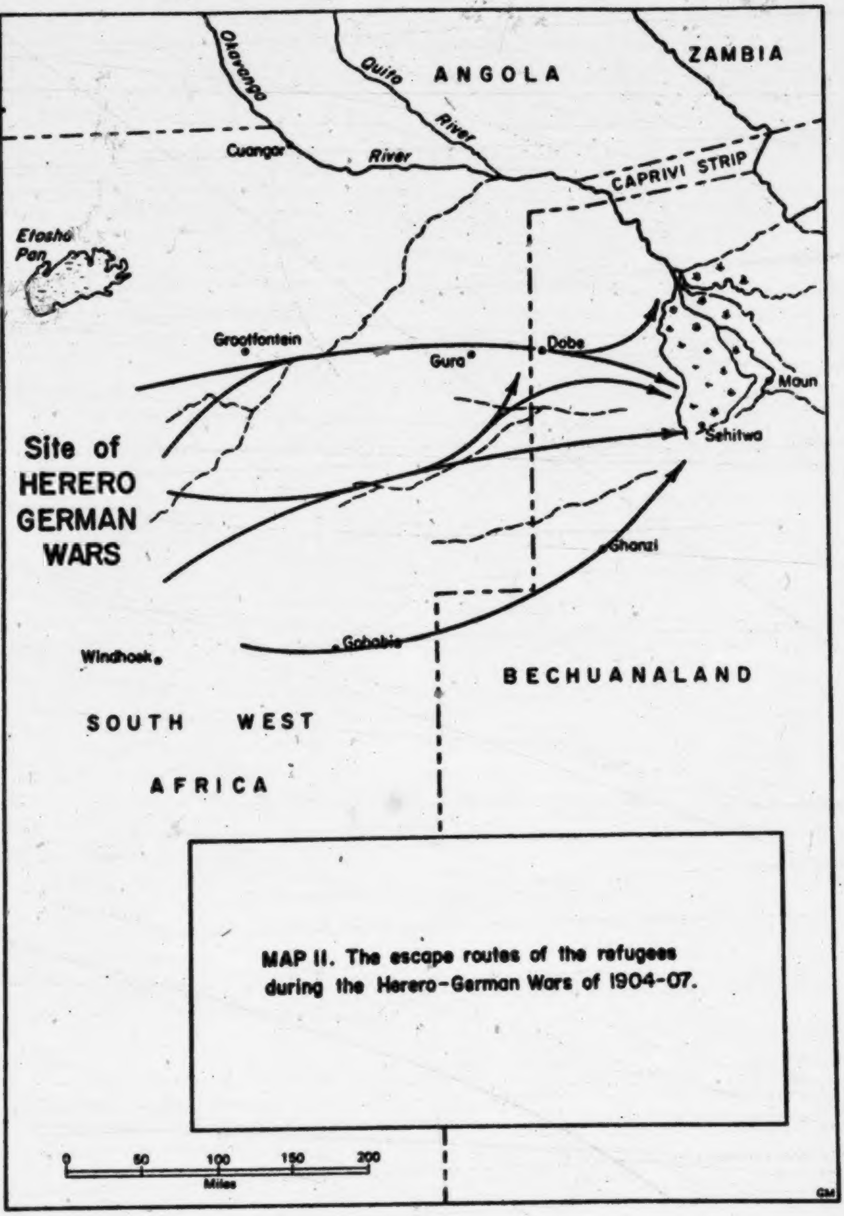
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Quito River
ANGOLA
ZAMBIA
Cuangar
River
CAPRIVI STRIP
Etosha Pan
Grootfontein
Gura
Dobe
Moun
Sehitwa
Site of HERERO GERMAN WARS
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Gobabis
Windhoek
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MAP II. The escape routes of the refugees during the Herero-German Wars of 1904-07.

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648 Bantu settlement, 1925-1960 - Around 1925, the first Bantu families came to live permanently in the Dobe area. These families and those that followed them were drawn largely from the Herero refugees who had settled in the Tsau area a generation before. They apparently decided to move up-country in order to escape the overcrowded and overgrazed conditions prevailing in the river districts. In the early 1930's, ten more families settled in the Dobe area. These newcomers deepened several of the natural waterholes and dug three new wells to bring the total number of permanent water sources to eleven. In 1934, Captain Webb visited the area and reported that the Bantu were occupying these waterholes on the Bechuanaland side and other waterholes on the South West Africa side of the border. Bantu families continued to settle in the Dobe area throughout the 1930's and 40's, until by 1948, there were an estimated 150 Bantu with 3,000 head of cattle resident up-country.

For many years the relations between Bantu and Bushmen had gone unregulated. There were reports of Bushmen stealing cattle and of retaliatory measures by the Bantu which included whipping Bushmen and coercing the young men into service as cattle boys. In 1948, the Batawana tribal administration appointed Isak Utuhile, a Mutawana man resident at !Xabe, as the first official Headman of the Dobe area. This

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appointment was precipitated in part by the murder in 1946 of a Mukgalahadi man by a !Kung Bushman. It was many months before a police patrol could reach the Dobe area to arrest the suspect.[1] The tribal government felt at the time that a more permanent representative of their authority was required. Isak described as his terms of reference the prevention of cattle theft and the prevention of exploitation of Bushmen by the Bantu. Since 1948, Isak has administered customary law and judged disputes from his Kgotla (court) at !angwa.

The Bantu population of the Dobe area remained stable until 1954 when there occurred a major influx of Herero pastoralists from the Makakun area to the east. The circumstances that brought this move about are worth mentioning because this migration initiated a series of political events that have produced the present curious situation in the Dobe area.

In the late 1940's, there had been an expansion of Tsetse fly into cattle-raising areas that had formerly been free of fly. This forced hundreds of pastoralists to evacuate the infested areas and thus put an even greater pressure on the grazing in the shrinking fly-free areas. The Dobe area, which starts 60 miles west of the Tsetse fly front, appeared

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[1] The suspect, a young man named ≠oma, was arraigned in Maun in September, 1946, but for unknown reasons was never brought to trial.

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to offer to the displaced Hereros an attractive living space. Accordingly some 18 families totalling over 120 people with 4,000 head of cattle trekked west in 1954. But instead of settling at the Dobe area wells, these migrants "leap-frogged" these wells and trekked directly into South West Africa where they occupied the waterholes of the Nyae Nyae area. There was a long standing precedent for such a move. Pastoralists from Bechuanaland had been summering cattle in South West Africa since the 1890's, and some of the Dobe area Bantu spent the year round at their South West cattle posts.

The Marshall family had made their first expedition to the Nyae Nyae pans in 1951. At that time they found a few of the water sources supporting Bantu cattle posts. They returned on their second expedition in 1955 to find what appeared to be a major Bantu encroachment of the Bushmen in the Nyae Nyae region. Their reports to the South West Administration led to the expulsion of these Herero in 1956 and the closing of the border to all movements of cattle. The Bantu were forced to withdraw to wells on the B.P. side and today the majority of them are bunched up at two wells within five miles of the border. Since 1957, the South African police have patrolled the border road and they have shot on sight any cattle that stray across the line into South West Africa.

175 648 The Bushman residents of Bechuanaland, however, were not immediately affected by these restrictions. They continued to hunt and gather on the South West side and to visit their kinsmen at localities in the Nyae Nyae area.

648 177 The period of European presence, 1960-1965 - In 1960, the South African Government put into operation its plan to civilize the !Kung Bushmen of the interior. A government station was set up at Tsumkwe where a borehole was sunk. Mr. C. V. McIntyre, the Bushman Affairs Commissioner, took up residence at Tsumkwe. The !Kung Bushmen from Nyae Nyae were [241] ingathered and provided with rations of maize meal. After they had been settled around the borehole a program was initiated to teach them agriculture. Because of a series of drought years this program has not met with success.

[162] By 1964, over 800 !Kung Bushmen had been settled at Tsumkwe. Less than 50 of these people had come from the [178] Bechuanaland side. It is not clear why the Bechuanaland [162] !Kung have not participated in this program to a greater [224] extent, but the fact remains that over 350 !Kung continue to [222] hunt and gather in the Dobe area and seem to indicate no intention of moving to Tsumkwe.[1]

648 The latest development in the political situation in

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[1] Some B.P. Bushmen insist that they were refused permission to live at Tsumkwe. Others say they fear to go there.

the interior is the construction of a cattle fence along the length of the Bechuanaland/South West Africa border. This job was scheduled to begin in February 1965, and will serve to isolate further the B.P. !Kung from their relatives in South West Africa.

IV. THE ENVIRONMENT

131 The area under consideration is a tract of land in Bechuanaland and South West Africa. The boundaries are the Okavango River on the north and east, the Ghanzi Farms on the south, and the edge of the South West African Escarpment on the west. The area thus defined (excluding transitional zones on the edges) is c. 160 miles x 160 miles = 25,600 sq. miles.

133 The area is characterized by a series of fixed dunes running parallel to each other 5-50 miles in length oriented approximately W 10° N / E 10° S. In the spaces between the dunes, 1-5 miles in width, are basins or molapos. "Molapo" is a Sechuana word meaning dry river bed. It is used throughout the thesis when referring to the longitudinal depressions between the dunes as well as the more deeply incised river valleys that do not conform to the parallel [114] patterning of the dunes. "Molapo" is the Sechuana equivalent of "omaramba", a Herero word used by J. Marshall (1957), Story (1958), and others.

The combination of basin and dune forms a remarkably uniform pattern from north to south. At several points the landscape is incised by deeper drainage systems that expose the bedrock. The molapo dune pattern is also interrupted by

133 three rock outcrops and one ring of large pans. These features are illustrated in Map 12, p. 71.[1]

Soils and vegetation

134 137 The dune crests and flanks are characterized by deep loose sand of red and white. These support a distinctive association of broad-leaved trees and shrubs. The molapos, both in the interstices of the dunes and in the more deeply incised river beds, are characterized by compacted grey soils. These molapos support an association of complex-leaved thorn trees and shrubs.

134 The color and composition of the soil appear to be a function of elevation. The color sequence from reddish to grey correlates with the texture sequence from loose to firm. These two sequences correlate with elevation within local drainage systems.

Thus the reddest, loosest sands are found on the crest of the dunes. The flanks of the dunes and the flats have buff white compacted soils, and the molapos have grey, highly compacted soils.

These sequences are schematized in Figure 1, p. 72.

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[1] As of April, 1965, there are no maps available for this area. Map 12 is based on the examination of aerial photographs on file at Maun, B.P. and the author's rough transects by Land Rover.

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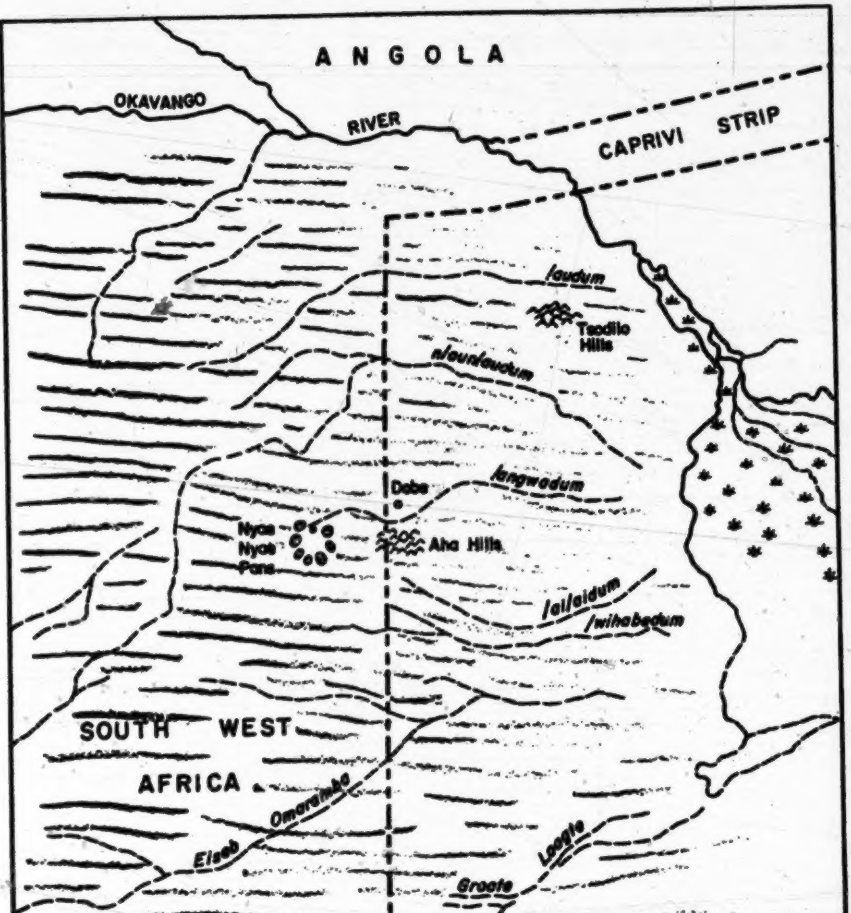
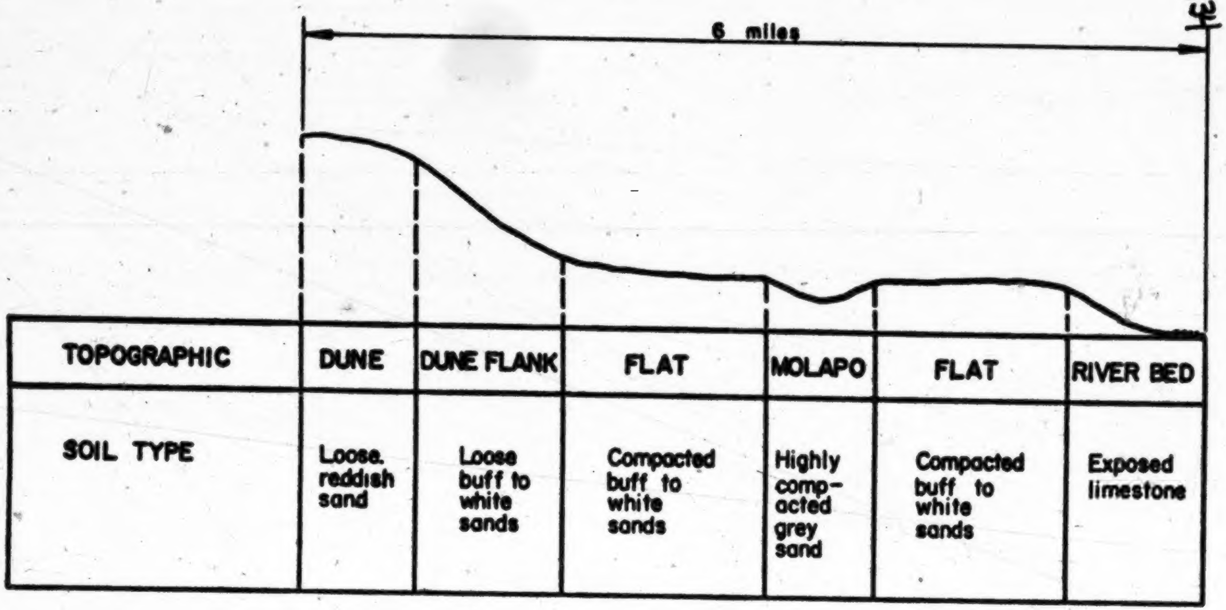

ANGOLA
OKAVANGO
RIVER
CAPRIVI STRIP
/audum
Tsodilo Hills
n/aun/audum
Dobe
!angwadum
Nyae Nyae Pans
Aha Hills
/ai/aidum
/wihabedum
SOUTH WEST AFRICA
Eiseb
Omaramba
Groote
Laagte
BECHUANALAND
Ghanzi
0
20
40
60
80
Miles

MAP 12. The physiography of the northwestern Kalahari Desert.



TOPOGRAPHIC	DUNE	DUNE FLANK	FLAT	MOLAPO	FLAT	RIVER BED
SOIL TYPE	Loose. reddish sand	Loose buff to white sands	Compacted buff to white sands	Highly compacted grey sand	Compacted buff to white sands	Exposed limestone

FIGURE I A schematized north-south cross-section through the Dobe Area, illustrating the correlation of soil color and texture with elevation (vertical scale exaggerated).

Plant geographers (e.g. Keay 1959; Cooke 1964) have divided this region in half. The southern half has been classified as "Kalahari grassland or mixed open Acacia wooded steppe", while the northern half is called "Bushveld and grassland".[1]

In fact, both types of habitat occur throughout the area: the Bushveld on the dunes and the Acacias in the interstices and river valleys.

Other workers have previously noted the significance of this molapo-dune topography. Maguire (n.d. circa 1954) divides the region into three vegetation types: the Dune association, the Omaramba (basin) association, and the Intermediate association, although he fails to define clearly the constituents of the latter type.

Since each kind of vegetation supports characteristic series of Bushman food plants and water sources, each will be considered in detail.

I. The Dune Association: Unlike the moving dunes of the Namib and southern Kalahari deserts, the dunes of the northern Kalahari are fixed by vegetation. The dunes support relatively closed forests of Ricinodendron and open woodlands of Burkea, Pterocarpus and Terminalia.

---

[1] South African ecologists make a distinction between "Thornveld" with Acacia spp. dominant and Bushveld with broad-leaved forms dominant (Acocks 1953; Wellington 1955).

137 The major trees of the dune association are:

Ricinodendron rautanenii[1]

Burkea africana

Pterocarpus angolensis

Baikiaea plurijuga

Terminalia sericea

Other important constituents include:

Combretum mechowianum

Bauhinia macrantha

Ximenia caffra

Strychnos pungens

S. spinosa

Guibourtia coleosperma

[262] Ricinodendron rautanenii (the mongongo nut), the major food of the Dobe area Bushmen, is found only on the crests of [312] the fixed dunes. Because of the loose nature of the soils there is no standing water on the dunes at any season of the year. The only source of water on the dunes is the rain water which collects in the crotches of the mongongo trees from November to March. Although the volume of water stored is minute, the proximity of the supply to the nut groves makes this an important source of water for the Bushmen.

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[1] The common tree species were identified with the aid of Miller (1952).

134 II. The Molapo Association

137 a) The bottoms of the dry river beds support a rather different association from the interstices between the dunes. The river valleys expose the underlying limestone formation. This rocky surface supports trees of the following species:

Commiphora africana
C. pyracanthoides
Combretum imberbe
Hyphaene ventricosa
Adansonia digitata

b) The interstices between dunes where the soils are compacted grey and limestone is only sporadically exposed, support the following:

Acacia mellifera subspecies *detinens*
A. heteracantha
Dichrostachys glomerata
D. cinerea
Croton gratissimus
Boscia albitrunca
Grewia flava

c) In some molapos the compacted soils are lighter grey verging on buff. Here are found dense thickets of *Terminalia prunioides* interspersed with stands of *Sclerocarya caffra*.

137 Certain species are characteristic of all three subdivisions of the molapo association, but are nowhere dominant.

137 These include:

Combretum imberbe
Hyphaene ventricosa
Dichrostachys glomerata
Grewia flava

The most important food plants of the Molapo association are:

Adansonia digitata
Hyphaene ventricosa
Grewia flava
Citrullus lanatus var. *vulgaris*

312 The molapo zones, being the lowest parts of the landscape, contain all the sources of permanent and seasonal standing water.

The permanent waterholes are confined to main river bottoms where the limestone is exposed. Most of these waterholes are natural fissures in the rock, but all have been improved and maintained either by the Bushmen themselves or the Bantu cattle herders.

The seasonal waters that exist for one to six months of each year are found both in the main river bottoms and in the dune interstices where local drainage patterns produce a catchment. These latter vary in size from small depressions 25 feet in diameter and a few inches deep, which hold water

312 for a few weeks after heavy rains, to great ponds up to 400 feet long which may hold water several months after the rains have ceased.

134 137 III. The 'Flats' Association: Intermediate in elevation between the dunes and the molapos are plains of buff to white compacted sands. These plains or flats support a vegetation which has affinities to both the dune and molapo associations. It also contains species that are not found elsewhere.

The flats may be divided into two intergrading types on the basis of soil differences:

a) looser buff sands supporting species that extend into the dune association and also several other diagnostic species.

b) compacted white sands supporting species that extend into the molapo association as well as several other diagnostic species.

III. a) Flats of loose sand have the following diagnostic species:

Lonchocarpus nelsii
Acacia giraffae
A. gilletiae
A. fleckii

as well as:

134
137

Terminalia sericea

Sclerocarya caffra

III. b) Flats of compacted sand have the following diagnostic species:

Acacia stolonifera var. A. hebeclada

A. dulcis

Ziziphus mucronata

as well as:

Hyphaene ventricosa

Terminalia prunioides

Combretum imberbe

Grewia flava

The most reliable marker species for distinguishing vegetation zones are:

1. Ricinodendron -- found only on dune crests
2. Commiphora africana -- found only on limestone
3. Terminalia sericea - T. prunioides -- These two species of Terminalia are sharply segregated ecologically. T. sericea is ubiquitous on looser buff to white sands but never on compacted sand. T. prunioides is found only on compacted buff to grey sands, never in loose sand.

133 The Dobe area vegetation and water: The foregoing remarks apply broadly to the 25,000 sq. miles delineated above. The Dobe area in the center of this tract contains all the major physiographic features (dunes, molapos, rock outcrop, pans) and will therefore illustrate the local patterning of

133
vegetation and water.

133 Map 13 shows the physiography of the Dobe area. The area
312 enclosed is approximately 2,700 sq. miles. The large river
course (upper right) flows from west to east (it runs about
once in ten years) and contains four of the eight permanent
natural waterholes in the area. Three additional waterholes
are located on limestone flats within a few miles of the main
course. The eighth waterhole is in the large molapo at the
southern edge of the map. In addition, there are three small
wells which have been dug by the Bantu in recent years. All
are situated in the main !angwa molapo.

Six interdune molapos are shown by single black lines.
The waters of three of these may reach the main river in
flood years. In most years, however, they fill internal
drainage basins only. The directions of flow are indicated
by the arrows. Five of the larger summer waters are represented
133 as open circles in the molapos. The map shows clearly how the
main molapos and the hills interrupt the east-west parallel
orientation of the dunes. The areas not represented as dunes,
molapos, or hills are flats and transitional vegetation zones.
It will be noticed that west of Dobe the flats extend in a
broad band 10 miles deep on either side of the molapo. Elsewhere the flats form narrow belts between the dunes and molapos.

Map 13 will be used in subsequent chapters as a base map

[TEXT CONTINUED ON PAGE 81]

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10

!Kung

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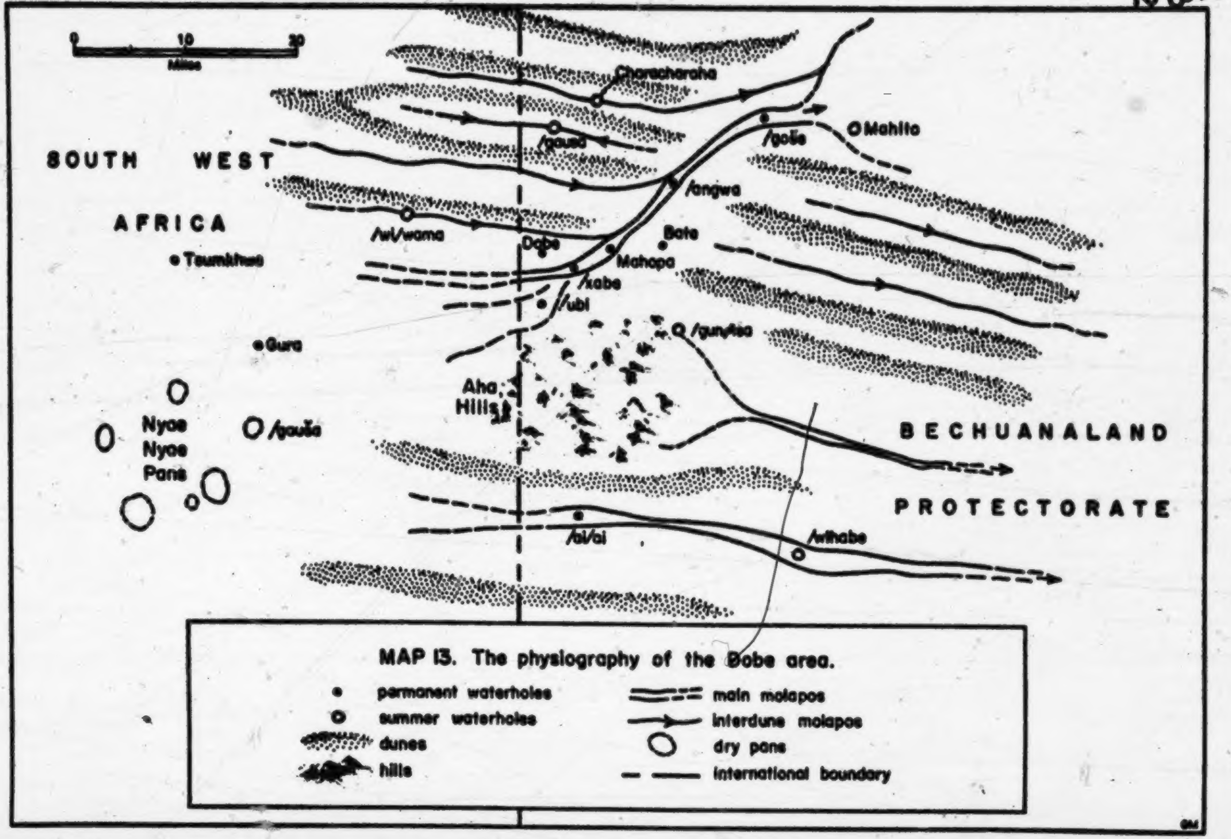
133
312



MAP 13. The physiography of the Dobe area.

0 10 20
Miles
SOUTH WEST AFRICA
BECHUANALAND PROTECTORATE
Characharaha
/gausa
/goše
Mahito
/angwa
/wi/wama
Dobe
Bate
Mahopa
Tsumkhwe
/xabe
//ubi
/gum/tsa
Gura
Aha Hills
Nyae Nyae Pans
/gauša
/ai/ai
/xihabe
● permanent waterholes
○ summer waterholes
dunes
hills
main molapos
interdune molapos
dry pans
international boundary

133 for plotting territorial divisions, group movements, and seasonal subsistence patterns.

Fauna

136 The main fact to be noted here is the comparative scarcity of migratory large game. There is evidence for a diminution in the abundance and variety of large game over the last seventy years. There are reports that the hunter Van Zyl killed elephant and rhinoceros at /gam, 60 miles south of Dobe in the 1870's. Some Bechuana informants found rhino at /ai/ai around 1915. /ai/ai is 25 miles south of Dobe. Today elephants are only occasional summer visitors in the Dobe area (two came in 1963, none in 1964). There are no rhino within 200 miles of Dobe. Springbok were present as late as 1950 (J. Marshall 1957) but they are absent today.

Ungulates: In terms of biomass the most abundant ungulates are kudu, wildebeeste, and gemsbok in that order. Kudu were observed in groups of 3-7 in all seasons. On one occasion a herd of twenty was seen. Wildebeeste occurred in all seasons in groups never larger than eight. This is in sharp contrast to the situation 200 miles south of Dobe where herds of several hundred are common. Gemsbok were sighted singly or in pairs in all seasons.

The most common antelopes numerically were the two nonmigratory species, steenbok and duiker. These were by far the most frequent Bushman kills during the study period. Wart hog were very common and frequently killed. In terms of diet this is the most important mammal.

None of the other large ungulates were common or were factors in Bushman diet. Those recorded are listed below.

zebra - one sight record (group of 4), never hunted by Bushmen.

giraffe - one sight record (group of 5), three killed by Hereros with rifles, none hunted by Bushmen.

buffalo - one sight record (a single animal), a summer visitor. In some years they are said to migrate in numbers from the swamps. This migration did not occur in 1963 or 1964.

eland - no sight record; said to be present, none killed in recent years.

roan antelope - one sight record (a single animal), no record of kills. The sable antelope which is so common east of the swamps is entirely absent on the west (Reay Smithers, personal communication).

red hartebeeste - three sight records, evidence of several being killed in recent years.

springbok - present until 1950, absent today.

impala - one pair of horns found; said to be very rare.

Carnivores: Paradoxically all of the major southern African carnivores are represented in the Dobe area although none of the larger ones are common. There were sight records or specimens for the following species. Those killed by Bushmen are marked by an asterisk.

lion
*cheetah
brown hyena
*caracul
*genet
banded mongoose
*ratel(honey badger)
*black backed jackal
leopard
spotted hyena
wild dog
wild cat
*slender mongoose
*zorilla(striped polecat)
*aardwolf
*bat-eared fox

The other larger mammals present were:

*ant bear - common, burrows found everywhere, one of the more frequent Bushman kills
*pangolin-(scaly anteater) present but not common
*porcupine-common, killed frequently
*springhare-very common, important item of diet

Of the small mammals, only four have been positively identified:

*common hare
ground squirrel
galago
tree squirrel

No bats or rodent species were positively identified. There is a Smithsonian collecting team in the field in 1965, making the first systematic collection of mammals in the Dobe area.

136 Finally there are three peripheral species that are resident on the edges of the area.

vervet - common at Tsodilo, not observed in the Dobe area

baboon - common on the Okavango River, said to penetrate the desert, not observed

serval - reported to be present, not seen.

136 262 Of these 40 odd species only ten were observed to be regularly hunted and eaten by the Bushmen. These are ranked in order of dietary importance.

1. wart hog
2. kudu
3. duiker
4. steenbok
5. gemsbok
6. wildebeeste
7. spring hare
8. porcupine
9. ant bear
10. hare

136 **Birds**: Seventy-five species were recorded during the study. These were identified with the aid of Roberts (1957) and Smithers (1964). The most common resident species are listed here. Very common species are marked by an asterisk.

*ostrich
*yellow billed kite
red-billed francolin
*crowned guinea fowl
*crowned plover
secretary bird
martial eagle
Swainson's francolin
kori bustard
*blacksmith plover

136

double-banded sandgrouse
cape turtle dove
Meyer's parrot
*grey loerie
lilac-breasted roller
*grey hornbill
yellow-billed hornbill
cardinal woodpecker
*fork-tailed drongo
penduline tit
*pied babbler
yellow-bellied bush warbler
Marico flycatcher
Crimson-breasted shrike
*long-tailed shrike
white-browed sparrow weaver

The common summer migrants recorded were:

hammerkop
white-bellied stork
red-billed teal
white-faced duck
European swallow

[262] Bird meat and eggs are not an important item of diet among the Dobe Bushmen. Only eight species were observed to be eaten:

red-billed francolin
Swainson's francolin
crowned guinea fowl
kori bustard
red-crested korhaan
double-banded sandgrouse
cape turtle dove
red-billed teal

Curiously, ostrich are not hunted for meat. They are tracked, [415] however, in order to find the nests. The eggshells are used as canteens for water.

Reptiles and Amphibians: Nine different species of snakes were seen. Only four could be identified taxonomically.

136 Poisonous:

1. black mamba
2. horned adder
3. puff adder
4. not identified
5. not identified

Non-poisonous:

6. rock python
7. not identified
8. not identified
9. not identified

Four species of the turtle family were recorded:

1. large leopard tortoise, *Geochelone* sp.
2. small leopard tortoise
3. not identified
4. not identified

Two species of chameleon:

1. *Rhampholeon* sp.
2. not identified

Seven species of lizard:

1. striped skink, *Mabuyu* sp.
2. *Zygodactylus* sp.
3. striped plate lizard, *Gerrhosaurus* sp.
4. marbled gecko, *Pachydactylus* sp.
5. land leguaan, *Varanus* sp.
6. not identified
7. not identified

136 Two species of frog:

1. Pyxiecephalus adspersus
2. Rana anchietae

[262] Of these twenty-four species, five were recorded as eaten:

1. rock python
2. large leopard tortoise
3. small leopard tortoise
4. land leguaan
5. the bullfrog Pyxiecephalus

[126] Invertebrates: Only a small percentage of the countless insects and other invertebrates present at Dobe were collected. One box of specimens was lost in the mail. Other identifications are pending. Below are listed thirteen species of invertebrates and a further sixty-nine species of insects.

Class Arachnida	Scorpions 2 spp.
	Spiders 3 spp.
	Ticks 2 spp.
Class Myriapoda	Centipede 1 sp.
	Millipede 1 sp.
Class Hirudinea	Leech 1 sp.
Class Unionidae	Freshwater clam 1 sp.
Class Helicidae	Land snails 2 spp.
Class Insecta	
Order Dictyoptera	
	Cockroach 1 sp.

136

Mantises 3 spp.

Order Phasmida

Walking sticks 2 spp.

Order Saltatoria

Grasshoppers 7 spp.

Cricket 1 sp.

Order Odontata

Dragonflies 2 spp.

Order Isoptera

Termites 4 spp.

Order Hemiptera - Heteroptera

Shield bug 1 sp.

Aphid 1 sp.

Order Neuroptera

Antlions 3 spp.

Order Lepidoptera

Butterflies 3 spp.

Moths 12 spp.

Order Diptera

Mosquito 1 sp.

Flies 6 spp.

Order Hymenoptera

Ants 2 spp.

Bee 2 spp.

Wasps 3 spp.

136 Order Coleoptera

Blister beetles 2 spp.
Click beetles 6 spp.
Dung beetle 3 spp.
Poisonous beetles 2 spp.
Other beetles 2 spp.

136
262 Insects do not play an important role in the diet. One species of antlion (determination pending) had an annual outbreak around the end of November. Tens of thousands pupate within a 36 hour period and the Bushmen eat them by the hundreds. In 1963, the outbreak occurred on November, 24, in 1964, on December 3.

Three different species of click beetle were eaten in March, 1964. These were considered a delicacy rather than a staple. The Bushmen said that certain grasshoppers and caterpillars were edible but they were not observed to eat them.

262
237 Honey is considered by all authors to be a major Bushman food (Bodenheimer 1951). It is curious therefore that it was rarely observed to be collected or eaten.

136
278 By far the most important insects for subsistence are the two[1] species of beetle used by the Bushmen for poisoning

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[1] Possibly as many as eight species of poison grub are used by the !Kung Bushmen! Koch (1958) collected five new species that the !Kung said were used for poisoning arrows. (See Shaw et al., 1963).

136 278 arrows: Diamphidia nigro-ornata and Polycada flexuosa. These are described in Chapter VI.

Climate

132 [133] The Kalahari Desert has a mean elevation of 3,000 feet above sea level and lies within the summer rainfall area of Southern Africa. These factors contribute to a climatic regime that is characterized by hot summers with a three to four month rainy season, and by moderate to cool winters without rainfall.

132 805 Five seasons may be distinguished in the Dobe area. Most Bushmen recognize five (although some divide the year into eight or more seasons) and their scheme will be followed here.

Seasons

1. !huma (spring rains) -- The Bushman year begins in October or November with the onset of the first rains. These consist of light convectional thundershowers that often fall on one area and miss other areas entirely. The first rains have the effect of triggering growth and reproduction in the flora and fauna and may overnight transform the landscape from a parched and dry state to one of lush greenery.

2. bara (main summer rains) -- These rains fall from December to March and coincide with the season of plentiful food. There is a wide variation from year to year in the

132
805 dates of onset and termination of the main rains. For instance, in 1963-64, the major rains were concentrated in an eight-day period in late November and early December and were very light during the next three months. In the following rainy season, 1964-65, the major rains came later. They were only just beginning when we left the study area in
[137] January, 1965. During the period of the main rains, the
[312] major summer foods (fruits, berries, melons) make their
[262] appearance, and there is standing water in the molapos far from the permanent wells.

3. *≠obe* (autumn) -- The autumn season is brief. In
[312] 1964, it fell in April after the rains had ceased. The weather remains warm and the high evaporation rates rapidly dry out the pools of summer water.

4. *!gum* (winter) -- This cold dry season extends from May through August. It is heralded by a sharp drop in nightly temperatures and during 1964 the Dobe area experienced six weeks of freezing or near-freezing nights in June and July. The days are clear and, by tropical standards, cool, often characterized by strong dessicating winds from the south and west with gusts estimated at up to 40 knots.
[312] Water is available only at the permanent wells and plant foods
[262] become increasingly scarce as the season progresses.

5. *!ga* (early spring) -- This season begins in late

132 805 [312] [262] August with a rapid increase in daily temperatures and ends in October or November with the onset of the first rains. It is a hot dry period during which water and food supply reach their annual low levels. However, the increasing day-length appears to prepare the flora and fauna for the season of reproduction which is triggered by the first rains.

Rainfall

Until 1961 there was no weather station in the central !Kung interior. In that year a rain gauge and other recording instruments were established at Tsumkhwe, South West Africa, a government station 35 miles west of Dobe. The data from this station are not available to the author. The only other sources of rainfall data are the author's fifteen-month series of measurements made at Dobe (1963-64) and the long-term records from stations on the periphery of the Kalahari. The peripheral stations and their rainfall are listed below:

South West Africa

Epukiro - (200 miles southwest of Dobe) - 13.2 inches per annum.

Grootfontein - (200 miles west of Dobe and 1,000 feet higher in elevation) - 17.3 inches per annum.

Bechuanaland Protectorate

Ghanzi - (175 miles south of Dobe) - 18.5 inches per annum.

132 Maun - (175 miles east of Dobe) - 18.6 inches per annum.

The rainfall recorded at Dobe for 1964 was only 6.9 inches. This is a much lower figure than that from any of the peripheral stations but it is within the range of annual rainfall estimated by the Marshalls. During their several expeditions to the central interior from 1951-59, they estimated that the annual rainfall varied between 6 and 10 inches (L. Marshall, 1965).

The period 1963-65 was one of severe drought in Bechuanaland. There were many instances of crop failures and drying up of waterholes throughout the Protectorate. Although it is not possible to judge accurately without comparative data for other years, it is probable that the Dobe area !Kung Bushmen experienced an unusually difficult subsistence situation during the period of the author's residence. [262] Because the Bushmen subsist on hardy wild foods which are drought-resistant, they did not suffer the hardships experienced by their Bantu neighbors whose crops failed three years in succession. However, it is possible that the Bushmen had to work harder, walk farther and dig deeper in 1963-64, than they would have had the rainfall been more abundant. This possibility should be kept in mind when evaluating their annual subsistence cycle (Chapter VIII).

The monthly record of rainfall at Dobe is shown in Figure 2, p. 94.

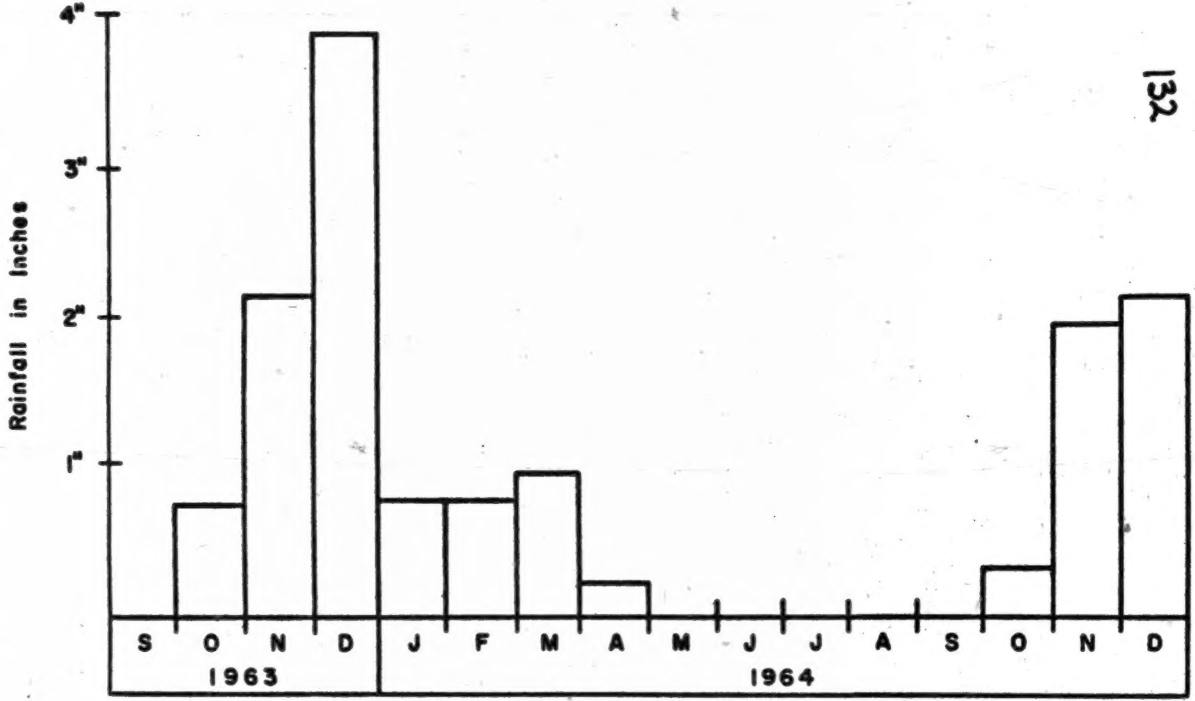

FIGURE 2. Rainfall at Dobe Bechuanaland, September 1963 through December 1964

Temperature

132 The records of daily temperatures maintained by the author are incomplete. The temperature data for six representative months are shown in Table 4. Using a standard Minimum-Maximum dry-bulb thermometer, the author recorded the lowest and highest temperatures in each twenty-four hour period. Column 1 of the table shows the average of all the daily minima recorded in each month and column 2, the average of all the daily maxima. Columns 3 and 4 show, respectively, the lowest and highest single recordings in each month. Column 5 shows the average diurnal range from low to high in each month. This figure was calculated by subtracting the mean low from the mean high for each month and it is rounded out to the nearest degree.

[126]

The critical temperature datum in terms of subsistence ecology is the daily maximum because this is an indicator of the heat conditions under which the people must hunt and gather. Walking in the sun on a day when the shade temperature is over 100°F imposes a much greater burden on the individual's fluid metabolism than does walking in the sun when the shade temperature is under 80°F. Consequently, a Bushman's daily water requirements are much greater in summer than in winter. The water/subsistence problem is considered in detail in Chapter VIII.

TABLE 4

MONTHLY RECORDS OF TEMPERATURE AT DOBE

BECHUANALAND 1963-64 (In Degrees Fahrenheit)

	mean low	mean high	record low	record high	average diurnal range
Spring					
October 1963	60.1	99.0	49	108	39
November 1963	62.9	96.3	61	102	33
Summer					
February 1964	66.8	100.0	63	105	32
Autumn					
April 1964	59.0	93.9	46	100	35
Winter*					
June 1964	30.4	78.4	26	84	48
July 1964	34.8	76.8	25	85	42

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*includes six weeks of freezing or near-freezing nights.

Day Length

132 [131] The Dobe area is situated at 20° south latitude and there is an annual variation in day length at this latitude of slightly less than two hours. In mid-winter (June-July) the sun rose about 7:00 a.m. and set at 6:00 p.m. In mid-summer the sun rose about 6:00 a.m. and set at 7:00 p.m. This seasonal variation plus a corresponding variation in temperature had a noticeable effect on the activity patterns of the Bushmen. During the winter they arose late and stayed around their camp fires until mid-morming. They concentrated their subsistence activities in the warmer middle hours of the day (10:00 a.m.-5:00 p.m.). On the other hand, during the hot summer days they adopted a "crepuscular" activity pattern. They arose at 6:00 a.m. and worked until 10:00 a.m. Whenever possible they spent the hottest mid-day hours resting in the shade. There was a second period of activity during the cooler hours of the evening (5:00-7:30 p.m.).

[484] When long hikes were undertaken the Bushmen had no alternative but to travel during the hottest hours of the day. Even during the hot dry season (September-October) they were never observed to hunt or travel at night.

V. SUBSISTENCE ECOLOGY: AN OVERVIEW OF PLANT AND ANIMAL RESOURCES

121 The concept of a hunting and gathering way of life has
assumed a misleading connotation in the ethnographic literature.
The term has come to imply a random precarious
existence searching for food, an eking out of subsistence
[433] of odds and ends. Since the present study is the first detailed
analysis of the food habits of non-agricultural people,
it should be stated at once that the Bushman subsistence is
based on a systematic strategy of exploiting abundant food
222 resources. Very little of their food gathering is left to
chance. Their knowledge of the local environment, of the
habits of game and the growth phases of food plants is
virtually exhaustive. In other words, the Bushmen know
where the food is at each season of the year and they arrange
their schedule of activities to take maximum advantage of
these resources. They do not allow themselves to get into
difficult situations, and even during the season of scarcity
they have available several alternative strategies of getting
food and water.

262 The security of their life is in part due to the fact
137 that the basis of their subsistence is plant foods which are
136 abundant, local and predictable. Meat is of secondary importance
in the Bushman diet. Game animals, by contrast to

262 plants, are scarce and unpredictable and people never depend
137 136 on meat for their basic subsistence. Therefore the well-
433 being of the Bushmen as a population can be viewed as the
product of two factors: the abundance of food resources in
their environment, and the intelligence and sophistication
which informs their exploitation of these resources.

512 Although the getting of food is the major activity of
433 Bushman life and is a major focus of Bushman thought, the
greater part of the waking life of the Bushmen is given over
to social, religious and trading activities that are largely
independent of the food quest.

Their emphasis on non-subsistence activities becomes
clear when daily records are kept of the activities of the
[126] members of a camp. For example, a diary of activities was
kept for the Dobe camp during July, 1964. This record was
[462] made during mid-winter, a season of comparative scarcity. It
was found that the 23 adults of this camp spent less than
half of their days in subsistence activities, an average of
23% of the time for the women and 40% of the time for the
[574] men. The majority of their waking hours were spent visiting
[521] other camps, entertaining visitors, resting, talking, hut
building, and making tools, clothing, and ornaments.

Plant Resources

137 136 There are well over 200 species of plants and 220 species

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136 of animals named and known by the Dobe area Bushmen. Of
[126] these 420 species, 350 species were collected and identified
433 by the author. Two-thirds of the plant species and half of
824 the animal species are utilized by the Bushmen. Of these,
825 they classify 85 species of plants and 54 species of animals as edible. It is therefore evident that the Bushmen have a remarkably broad subsistence base. On closer examination, however, one finds that the Bushmen are highly selective in their food habits. In fact, only nine species of plants constituted about three-quarters of the total vegetable diet; and one species alone, the mongongo nut, accounted for at least half of the total. Furthermore, of the 54 animal species eaten, only 17 species were consistently hunted.

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262 A plant species may be regarded by the Bushmen as a major food for one or more of several reasons. Certain foods are prized because of their abundance or because of the long season during which they are available. Other foods are prized because of the ease with which they are collected. For this reason fruits are generally more popular than roots since the latter have to be dug out of the ground. Then there are foods which are especially good tasting and/or believed to be highly nutritious. The various plant foods are evaluated pragmatically and rationally and few species
825 are restricted by magico-religious taboos. This is in sharp
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262 contrast to the evaluation of animal foods all of which fall under taboos of varying strictness.

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262 By using these criteria of abundance, duration of eating season, ease of exploitation, tastiness and nutritional value, the Bushmen have arranged the universe of edible plants hierarchically in terms of the overall desirability of each species as food.

This scheme divides the 85 edible species into six classes:

I.	Primary	1 species
II.	Major	8 spp.
III.	Minor	14 spp.
IV.	Supplementary	32 spp.
V.	Rare	13 spp.
VI.	Problematic	17 spp.
TOTAL		85 species

I. Primary food - All Bushmen of the Dobe area agree that their primary food is the nut of the mongongo (mangetti) tree: *Ricinodendron rautanenii*. This food rates high on all the criteria of desirability described above. It is superabundant (millions of nuts rot on the ground each year for want of eating); it is eaten in all months of the year; it is easy to collect, has a delicious taste, and is highly

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nutritious.[1]

It should be added that meat is considered by all the Bushmen as a primary food. Informants agreed that an ideal diet should consist primarily of meat and mongongo nuts. In actual practice this ideal is not always attained.

II. Major foods - After Ricinodendron there are eight species that Bushmen consider as major foods but none of these rate high on all five criteria of desirability. There are three species which are superabundant in quantity and delicious to the taste, but are available for only a short period of the year. They flourish during the rains but by winter, three months later, they have become shrivelled and dried out. The three summer species are: Grewia flava, the morethlwa berry; Ximenia caffra, the sour plum; and Citrullus [312] lanatus, the famous Tsama melon. The latter species also serves as an alternative source of water but this is not important in terms of food strategy because the season of Tsama melons coincides with the season of abundant standing water. Among the /gwi Bushmen of the Central Kalahari Game Reserve, the Tsama melon is a more important source of water because it

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[146] [1] The nut of Ricinodendron has been chemically analyzed (quoted in Watt and Breyer-Brandwijk 1962:428). The kernel of the nut was found to yield 60%, by weight, of a quick-drying fixed oil, rich in proteins. The fruit of the nut, which is also eaten by the !Kung Bushmen, yielded, among other constituents, 31% saccharose and 7.9% protein.

824 persists into the winter dry season (Silberbauer 1965).

262 The fruit of the baobab tree, Adansonia digitata, is another of the major foods. It is most important during winter but tends to rot if left on the ground and therefore cannot be eaten in all months of the year.

The vegetable ivory palm, Hyphaene ventricosa, has two edible parts. The fruit of the mature form is abundant but yields very little of food value. The dwarf form of the palm lacks fruit but the heart of the stalk is an important item of diet. This latter food has two distinct disadvantages. It is difficult to collect because the stiff palm fronds must [104] be laboriously hacked away to reach the heart. Also those who eat its fibrous pulp complain of stomach cramps and diarrhea. Therefore it is eaten only when more desirable foods are not available.

The nut of the morula tree, Sclerocarya caffra, is a delectable food, even tastier than the mongongo nut. But it rates low on the important criterion of ease of eating. The nut meats are small and crumble easily; so they must be carefully picked out of the shell with a thorn. This operation requires patience and it was observed that the women ate many more morula nuts than did the men. The morula tree is also important in subsistence because one of the species of beetle used in arrow poison feeds on its leaves.

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Bauhinia esculenta, the "Tsi bean", ranks with Ricinodendron as the primary food of the Nyae Nyae Pan area (L. Marshall 1965), where both the beans and roots are eaten. In the Dobe area, however, this species of Bauhinia has a spotty distribution. In order to reach the large groves, the Dobe area Bushmen must travel long distances to the borders of the Nyae Nyae area. Because of this factor, the "Tsi bean" is not popular in the Dobe area, where the alternative primary food, Ricinodendron, is locally abundant.

[312] The last of these eight major species is, in a sense, the most important, not because of its abundance or its food value (it is neither plentiful nor nutritious) but because of its water storage properties. This is the plant, Fockea monroi, the root of which may contain up to a pint of water. At the end of the dry season when food has become exhausted within a walking radius of the permanent waterholes, people often move into the waterless bush where food is still plentiful. Here they are able to live for one or two weeks by digging out and drinking the juice of the Fockea roots.

It may be useful to think of Ricinodendron and Fockea as the "alpha" and "omega" of the Bushman food plants. The first, Ricinodendron, is the food that carries the Bushmen through the months and years, while the second, Fockea, is the critical plant that enables the Bushmen to eat well through the short but severe dry hot season.

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III. Minor foods - Next in importance to these nine species is a series of 14 species which rate high on one or two of the criteria of desirability. These include seven species of edible roots and bulbs (including Coccinia spp., Eulophia spp., Lapeirousia spp., Vigna spp., and Walleria spp.) which taken individually are not important but as a class they become a major item of diet during the winter dry season. This is the time of year when the more abundant summer fruits and melons are not available. The winter foods include as well the edible gum from the trees Terminalia sericea and Acacia mellifera.

Five of these minor foods occur only during the summer. These include the berries of three species of the genus Grewia, and the edible leaves of the species Dipcadi glaucum and Talinum crispatulatum.

All of the species of Class III are seasonally limited. When available, each species was eaten several times a week. On this basis they can be distinguished from the major foods of Classes I and II which were eaten daily.

IV. Supplementary foods - There were 32 species of plants which were supplementary to foods of Classes I, II, and III, or which were eaten when the more desirable foods had become locally exhausted. The list comprises ten species of fruits and berries (including five species of Grewia), two species of melon, one species of leafy green, ten species of edible gum, and nine species of roots. The roots taken as a class were especially important during the winter season when the fruits and berries were not available. In general, the foods of Class IV were both less abundant and less tasty than the corresponding foods of Class III.

V. Rare foods - This class of foods includes 13 species which were observed to be eaten only on a few occasions. Nevertheless, several of these were classified as important foods by the Bushmen. For instance, the fruit of Guibourtia coleosperma was considered excellent eating, but this tree bears fruit only once in several years. Had the study been carried out during a year when Guibourtia was in fruit, it might have ranked higher. Maguire (n.d.), who did botanical research near Dobe in 1952-53, has listed Guibourtia as a major food.

Most of the foods in Class V were locally uncommon. These include two species of fruit, eight species of root, and the curious parasitic plant Hydnora sp. which bears an underground fruit (Story 1958:19-20).

VI. Problematic foods - Finally there are seventeen species which the Bushmen said were edible but which were not observed to be eaten during the study period. Some of these

824 262 such as Boscia albitrunca and Bauhinia macrantha did not come into fruit in 1963-64 because of the drought. The majority were not eaten because of their unattractive taste and because more desirable foods were available.

These 85 species are listed alphabetically by class in Table 5, pp. 108-110.

The way in which the Bushmen arrange these 85 plants in order of their importance as foods suggests a productive analogy to the way they utilize space in subsistence activities.

262 222 The Bushmen typically occupy a camp for a period of weeks and eat their way out of it. For instance, at a camp in the mongongo forest, the members of the camp will exhaust the nuts within a one-mile radius the first week of occupation, within a two-mile radius the second week, and within a three-mile radius the third week. The longer a group lives at a camp, the farther they must travel each day to get food. This is a feature of daily subsistence that occurs at both winter and summer camps. For instance, at the Dobe winter camp, in June the gatherers were making daily round trips of six to nine miles to reach the mongongo nuts. By August the daily round trips had increased to ~~twelve~~18 miles.

This progressive increase in walking distance occurs because the Bushmen are highly selective in their food habits. They do not eat out all the food in a given area. They start

[TEXT CONTINUED ON PAGE 111]

TABLE 5

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THE 85 SPECIES OF BUSHMAN FOODS ARRANGED, BY CLASSES, IN ORDER OF DECREASING DESIRABILITY

Class I.	Primary Food	
1.	Ricinodendron rautanenii	(fruit and nut)
Class II.	Major Foods	
2.	Adansonia digitata	(fruit)
3.	Bauhinia esculenta	(beans and root)
4.	Citrullus lanatus	(melon)
5.	Fockea monroi	(root)
6.	Grewia flava	(berry)
7.	Hyphaene ventricosa	(fruit and stalk)
8.	Sclerocarya caffra	(fruit and nut)
9.	Ximenia caffra	(fruit)
Class III.	Minor Foods	
10.	Acacia mellifera	(gum)
11.	Coccinia rehmannii	(root)
12.	Coccinia sp. (or Trochomeria sp.)	(root)
13.	Diospyros chamaethamnus	(fruit)
14.	Dipcadi glaucum	(leaves)
15.	Eulophia sp.	(root)
16.	Eulophia sp.	(root)
17.	Grewia bicolor	(berry)
18.	Grewia flavescens	(berry)
19.	Lapeirousia coerulea	(bulb)
20.	Talinum crispatulatum	(leaves)
21.	Terminalia sericea	(gum)
22.	Vigna dinteri	(root)
23.	Walleria muricata	(bulb)
Class IV.	Supplementary Foods	
24.	Acacia erubescens (var. A. dulcis)	(gum)
25.	A. fleckii	(gum)
26.	A. gillettiae (var. A. uncinata)	(gum)
27.	A. giraffae	(gum)
28.	A. heteracantha	(gum)
29.	Annona stenophylla	(fruit)
30.	Burkea africana	(gum)
31.	Ceropegia sp. nr. C. leucotaenia	(bulb)
32.	C. sp. nr. C. mozambicensis	(bulb)
33.	Citrullus naudinianus	(melon)
34.	Coccinia sessilifolia	(melon and root)
35.	C. sp.	(root)

824 36.	Combretum imberbe	(gum)
262 37.	C. mechowianum	(gum)
38.	Cyperus fulgens	(bulb)
39.	C. sp.	(bulb)
40.	Dichrostachys glomerata	(gum)
41.	Dipcadi longifolia	(bulb)
42.	D. sp.	(bulb)
43.	Grewia avellana	(berry)
44.	G. falcistipulata	(berry)
45.	G. retinervis	(berry)
46.	G. subspathulata	(berry)
47.	G. sp.	(berry)
48.	Mukia maderaspatana	(leaves)
49.	Raphionacme sp.	(root)
50.	R. sp.	(root)
51.	Strychnos spinosa	(fruit)
52.	Terminalia prunioides	(gum)
53.	Vangueria longicalyx	(fruit)
54.	V. infausta	(fruit)
55.	Ximenia americana	(fruit)

Class V. Rare Foods

56.	Corallocarpus welwitschii	(root)
57.	Cucumis sp.	(root)
58,	Guibourtia coleosperma	(berry)
59.	Hydnora sp.	(root)
60.	Ipomoea verbascoidea	(root)
61.	Lapeirousia sp.	(bulb)
62.	Nymphaea sp.	(root)
63.	Ochna pulchra	(berry)
64.	Raphionacme burkei	(root)
65.	R. sp.	(root)
66.	Salacia lubberti	(fruit)
67.	Strychnos pungens	(fruit)
68.	Vigna unguiciculata	(root)

Class VI. Problematic Foods

69.	Acacia karoo	(gum)
70.	Amaranthus sp.	(leaves)
71.	Aristida gracilior	(seeds)
72.	Bauhinia macrantha	(beans)
73.	Boscia albitrunca	(fruit)
74.	Cephalocroton pueschellii	(fruit)
75.	Clerodendrum uncinatum	(fruit)
76.	Combretum psidioides	(gum)
77.	C. zeyheri	(gum)
78.	Dichapetalum cymosum	(fruit)
79.	Dichrostachys cinerea	(gum)
80.	Dipcadi longifolium	(bulb)
81.		

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262 81. Grewia sp. (berry)

82. Ziziphus mucronata (berry)

[192] 83. not determined - !Kung name -"todi" (root)

84. not determined - !Kung name -"!gwi" (root)

85. not determined - !Kung name -"//aižeri" (root)

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by eating out the most desirable species and when these are exhausted they then turn to the less desirable species. Because the food resources are both varied and abundant, in any situation where the desirable foods are scarce the Bushmen have two basic alternatives in food strategy:

- first they may walk farther in order to continue to eat the more desirable species,
- or, they may remain closer to camp and exploit the less desirable food species.

For instance, at the Dobe winter camp mentioned above, by August the younger members were making the long round trip to the mongongo nuts, but the older members were exploiting foods of Classes III and IV which they had hitherto ignored and which were still abundant close to the Dobe waterhole. There was a general but not invariable tendency at each camp for the Class I and II foods to be locally exhausted first, then the Class III foods were exhausted and only then were the Class IV foods systematically gathered. One never observed the complete exhaustion of foods around a camp, because the Bushmen always moved camp long before the foods of Class IV had reached scarce levels.

These alternative strategies will be documented in later chapters. For the present one should bear in mind that !Kung subsistence always has two dimensions. There is a spatial

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262 dimension in which the gatherers move farther and farther in order to eat the desirable foods, and a hierarchical dimension in which people remain in one area and eat their way through classes of species of decreasing desirability.

136 Animal Resources

The 223 known species of animals in the Dobe area are divided taxonomically as follows:

mammals	42 spp.
birds	75 spp.
reptiles and amphibians	24 spp.
invertebrates	82 spp.
TOTAL	223 spp.

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825 Mammals - The mammals represent the highest percentage of animal biomass in the Dobe area and it is not surprising that the meat of mammals accounts for over 90% of the animal diet of the Bushmen. In all, 29 of the 42 mammal species are known to be eaten by the Bushmen and only seven mammal species are universally tabooed as food.

Personal, age specific, and sex specific taboos play an important role in the eating of mammals. No individual Bushman will eat all of the 29 eaten species and no two individuals have the same set of tabooed species. Each person has his own prescription of what species he may and may not eat. The mammals can be divided into seven degrees of taboos.

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First, there are nine species which are eaten by all people regardless of sex and age, although there are restrictions on the anatomical parts. For instance, women may not eat kudu intestines, but may eat the meat of the extremities. This class of animals includes:

giraffe
eland
roan antelope
gemsbok
wildebeeste
hartebeeste
kudu
duiker
hare

A second group of species may be eaten by all except premenstrual adolescent girls. The mammals include:

steenbok
springhare

Third are the species that are eaten by most people. Individuals may not eat one or another of these species because of personal dietary restrictions set by the ritual curers:

wart hog
buffalo
antbear
porcupine
bat-eared fox
pangolin

Fourth are species that are eaten by a few people of both sexes and are avoided by most people:

genet
honey badger
aardwolf
slender mongoose
banded mongoose
cheetah

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Fifth are species that are eaten only by old women for whom the food taboos of adult life have been lifted:

lion
leopard
jackal
caracul
zebra

Sixth is a species that is eaten only by ritual curers for magical purposes:

cape polecat (zorilla)

Finally there are seven species that are universally tabooed. These include the carnivorous species that are said to eat people:

spotted hyena
wild dog
brown hyena
wild cat

as well as three species of primates that the Bushmen say are close relatives of man:

vervet monkey
galago
baboon

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The small mammals, such as rodents, bats, and squirrels, are not hunted or eaten. The Bushmen said that no taboos were associated with these species. However, these species were not worth killing because each carried only a few ounces of meat. Occasionally squirrels that are found dead or accidentally caught in snares are fed to the dogs.

The important point in terms of food resources is that

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262 all hunters may hunt every species regardless of whether a
224 given species is personally tabooed.

In actual practice only ten species of mammal were consistently hunted by the Dobe area Bushmen. These are: kudu, wildebeeste, gemsbok, steenbok, duiker, wart hog, antbear, porcupine, springhare, and common hare.

In addition to the above a further ten species were observed to be occasionally killed and eaten. These include:

pangolin
genet
aardwolf
slender mongoose
caracul
bat-eared fox
honey badger
cheetah
jackal
cape polecat

825 The Bushmen generally consider the meat of herbivorous
262 mammals as the most desirable food. The meat of insectivorous mammals such as antbear, pangolin and bat-eared fox is less highly prized. The meat of carnivores is generally undesirable but nevertheless eaten by at least some people, when it is available. At the bottom of the list of preferences is the meat of hyena and wild dog. The Bushman explanation is that since these species eat people, to eat their meat is indirectly an act of cannibalism.

[224] There is evidence of regional and historical variation in the species systematically hunted by the !Kung of the

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224 central interior. John Marshall found that most of the meat brought in by the Nyae Nyae area hunters was from the large ungulates such as wildebeeste, eland and gemsbok. Small mammals such as springhare were rarely hunted (1957, and personal communication). By contrast, the most frequent kills in the Dobe area were the smaller animals: springhare, steenbok and duiker, whereas the killing of a large antelope was a rare and great event. Giraffe and eland were not hunted by the men of the Dobe area.

[173] The older Bushmen state that in the early days there were more game animals and more Bushmen in the central interior and that their forefathers used to hunt in large groups, killing giraffe, buffalo and even elephant.

At present, the most important single source of meat in the Bushman diet is wart hog. It was not the most frequent mammal killed. Springhare, steenbok and duiker were all killed more frequently than wart hog. But the southern African wart hog weighs about 170 lbs., whereas the springhare weighs only 7-1/2 lbs, the steenbok, 25 lbs., and the duiker 43 lbs. At the Dobe camp wart hog were killed at the rate of three per month throughout the study period. The edible portion of each carcass is about 50%. Therefore wart hog provided a regular supply of c. 255 lbs. of meat per month to the members of the Dobe camp.

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224 Steenbok and duiker were the next in importance because of the frequency with which they were killed, especially during the winter when they were systematically trapped and during late spring when the young could be easily run down on foot.

Springhare were the most frequent animal killed. The 7-1/2 lb. carcass has a high percentage of edible meat (60%) and the killing rate in some seasons was as high as 10 per week.

It is difficult to evaluate the large antelopes, kudu, wildebeeste, and gemsbok in terms of their dietary importance because [illegible]ey were rarely killed. A hunter who had killed five large antelopes in a year was considered to be above average. Most of the hunters killed one or two per year, Even a single kill, however, provides a massive return in meat. The average dead weights[1] of these species are:

kudu (M)	600 lbs.
kudu (F)	350 lbs.
gemsbok (M)	444 lbs.
gemsbok (F)	514 lbs.
wildebeeste (M)	550 lbs.
wildebeeste (F)	450 lbs.

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[1] All the mammal weights quoted in this study were provided by Reay Smithers (personal communications).

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224 By killing one male kudu (600 lbs.) with a weight 24 times greater than that of a steenbok (25 lbs.) a hunter would provide his camp with a quantity of meat roughly equivalent to that provided by 20 steenbok (assuming that the kudu has a somewhat lower ratio of edible to inedible parts than does a steenbok).

[628] On the face of it, hunting large antelope would appear to have overwhelming advantages in terms of meat. However, when news of such a kill reaches neighboring camps, dozens of friends and relatives descend upon the killer's camp to assist him in disposing of the meat. Thus at the end of several jovial days the superabundance of meat disappears and the fortunate hunter is out looking for meat again. The killing of a large antelope therefore has more prestige value than nutritional value to the family of the man who killed it.

This pattern of sharing large kills beyond the boundaries of a camp is ecologically adaptive because meat spoils quickly, especially during the rainy season and it is often necessary to eat meat that is in danger of becoming rotten.
825 The Bushmen know how to make biltong (dried strips of meat)
262 but rarely do this. This infrequency of making biltong is
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251 probably both a cause and an effect of sharing meat widely. The only part of a large antelope kill that is consistently set aside for future consumption is the hide. This part of

825 262 224 [251] the animal evidently has much better storage properties than the flesh.

In general, the larger the animal killed, the more widely its meat is shared. The meat of springhare, hare, steenbok, and duiker is usually consumed by the hunter's immediate family. The meat of wart hog, antbear and porcupine is [628] shared out among the members of a hunter's camp. The meat of kudu, wildebeeste and gemsbok is shared out among the hunter's camp and among members of neighboring camps.

825 262 223 Birds - The eating of birds again illustrates the selective food tastes of the Bushmen. Of the 75 species of birds recorded only eight species were said to be eaten and of these only four species were observed to be systematically hunted. The four important game birds were:

crowned guinea fowl
Swainson's francolin
red-billed francolin
red-crested korhaan

The other birds eaten were:

Kori bustard
Cape turtledove
double-banded sandgrouse
red-billed teal

Snares were regularly set in order to capture guinea fowl, francolin and korhaan. Occasionally other birds triggered the snares. Usually these other species were fed to the dogs. Occasionally they were simply discarded.

222 262 825 Only the eggs of the above eight species appeared to be

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gathered and eaten. With one exception all other birds eggs were ignored. The exception was the ostrich eggs which were highly prized as water containers and as material for making ostrich egg shell beads.

Reptiles and Amphibians

Only four species of reptile - two tortoises, one leguaan, and the rock python - were regarded by the Bushmen as edible. One species of frog, Pixiecephalus sp. was regarded as edible. Of these five species, the large leopard tortoise (Geochelone pardalis) is the most important food. These tortoises weigh 5-8 pounds. ..s. They are sluggish and easily collected. For this reason, the tortoises were the only species of vertebrate that were collected by the women. All other vertebrates were the exclusive concern of the men.

The rock python, a large non-poisonous snake, was regularly collected by the men. This provided c. 25 lbs. of meat per specimen. The pythons collected varied in length from 8-15 feet. The other three species were rarely observed to be eaten.

Invertebrates

Insects have traditionally been considered by ethnographers to be a major Bushman food (Bodenheimer 1951:137-195). However, among the Bushmen of the Dobe area insects played a minor role in the diet. One species of antlion and three

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262 species of beetles were observed to be eaten. Termites and [825] locusts were not eaten. Honey is highly regarded as food by the Bushmen, and the hunters often investigated bees nests but honey was never observed to be eaten at the Dobe camp and only rarely at other camps.

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825 In summary the plant and animal resources of the Dobe area include 85 plant and 54 animal species which are eaten. Closer examination reveals that only a small number of these edible species play a major role in the diet. Only 26 of the 139 edible species may be considered as major Bushman foods: 9 species of plants and 17 species of animals.

VI. ORGANIZATION AND TECHNOLOGY OF SUBSISTENCE

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224
462 There is a basic division of labor between the sexes: the men are hunters of game and the women gatherers of plant foods. The men, however, do combine gathering with hunting. For instance, if no game has been killed on a hunt the men will gather some vegetable food as they return at the end of the day so that they will not come home empty-handed. The organization of work is simple. The sexes are almost always segregated in food-getting activities. Typically the women of a camp will go out in groups of three to five, with a well-defined objective of which species they want to collect. They spend the day or part of it working over an area and return to the camp each evening with their food. They never remain out overnight.

224
462 The hunting groups of the men are smaller than the collecting groups of women. Typically two men will go out hunting together, but frequently an individual will go hunting alone. More rarely groups of three or four men go out. Hunting groups of five or more men were never observed during the study period. The Bushmen feel that too many participants spoil the hunt. The men very rarely stay out overnight. Even if they have shot an antelope in the afternoon they return to the main camp to sleep and early the next morning set out to

224 track the animal to the place where it has died. All the
462 [222] Dobe area Bushmen consistently hunted and collected within
a 15-20 mile radius of their camps. Hunting trips of 3-10
days duration have been recorded in the literature on !Kung
(e.g. L. Marshall 1960:331), but these extended trips were
not a feature in the Dobe area.

222 The contrast in technology between the hunting equipment
224 462 of the men and the gathering equipment of the women is
striking. Only three elementary tools are required for the
complete range of gathering tasks. On the other hand, the
hunting kits consist of at least 19 complex weapons and
devices, with sophisticated methods of manufacture and
maintenance.

222 The three gathering tools are the kaross, the digging
stick and the nut-cracking stones. With only these three
items, a softened antelope hide, a sharpened stick, and a
pair of unimproved rocks, the entire gamut of plant foods
[291] can be exploited. The kaross is the most important of the
three. This is a one-piece combination garment-cum-carrying-device made from the hide of a gemsbok, kudu or wildebeeste.
[281] The raw hide is dried, the edges are trimmed and the hide is
softened by a tanning agent from the plant Elephantorhiza
burkei. The resulting garment is worn by the women draped
[482] over the back. When tied at the waist by a leather thong,
[291]

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482
[291]
the lower half of the kaross conceals the wearer's backside while the upper half forms a pouch for carrying vegetable foods (as well as water containers, firewood and babies).

Since most of the Bushman foods are nuts and berries, ranging in size from 1/2 to 1-1/2 inches in diameter, and hundreds of these small foods make up a family's daily diet, Bushman life would not be possible without some means of carrying quantities of these small foods back to the camp or "home base". One cannot overstate the importance of the food-carrying device for Bushman life, and for the life of hunting and gathering peoples in general. This, I think, has implications for the evolution of human subsistence during the Pleistocene since a device for carrying vegetable foods would seem to be a prerequisite for human camp life.

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The digging stick is secondary in importance to the kaross because all but one of the major Bushman foods are nuts, berries and melons which do not have to be dug out of the ground. The typical digging stick is three feet long, three quarters of an inch in diameter and sharpened into a blade at one end. It is made from the thick straight stalks of the bushes of the genera Dichrostachys and Grewia. It [224] is not weighted by a bored stone. Apart from its obvious use for digging out edible roots and bulbs, the digging stick also plays an important role in mens' hunting activities.

224
412 Four of the ten important game species (wart hog, antbear, porcupine, and springhare) live in underground burrows and it is often necessary after running an animal to ground for the hunter to excavate to the burrow in order to retrieve the [482] carcass. The men also use the digging stick as a carrying yoke on which to bring home game.

412
222 The third tool is a pair of nut-cracking stones. Without these it would be impossible to exploit the abundant mongongo nut (Ricinodendron) as food because of its extremely hard shell. Any reasonably hard stone may be used including the locally abundant limestone cobbles. The hammerstone is fist-sized and no flakes are struck off. The anvil stone may be any size and shape up to a weight of fifteen pounds. Neither of these stones is improved in any way and only the pecking marks show evidence of human use. The nut is held on the anvil stone between the fingertips of the left hand. With the hammerstone one delivers two to five sharp and dextrous blows which are sufficient to open the nut.

Through the generations, pairs of these stones have become distributed throughout the nut forests of the Dobe area. It is only occasionally necessary for a woman to carry her own cracking stones from one camp to another.

It may be useful to re-examine the Stone Age lithic assemblages with the nut-cracking stones in mind.

412 The women possess several other tools which are of subsidiary importance in the food quest:

- wooden mortar and pestle
- wooden spatula for moving ashes
- carved wooden serving spoon
- tortoise shell bowl
- bundle of tail feathers for fanning the cooking fire
- pottery containers of Bantu manufacture
- 415 iron pots and enamel bowls of European manufacture.

177 224 411 The mens' hunting kit represents the most evolved sector of Bushmen technology. It includes at least 19 different tools made from seven kinds of raw materials. The primary weapons include:

[177] → 1. bow
[278] ← 2. arrow poison
[231] → 3. spear
4. springhare probe
5. knobkerrie(club)
6. iron tipped arrows
7. quiver
8. hunting dogs
9. rope snares

Secondary weapons include:

[312] ← 10. fire drill
[177] → 11. flint and steel fire
[412] → making kits
[283] → 12. digging stick
[177] ← 13..iron knife
14. iron adze-axe
15. carrying yoke
16. knotted net

Manufacturing and repairing tools include:

[278] 17. poison-making kit; humeral cup, pestle, applicator

[415] 18. whet stones of basalt

[283] 19. wild cotton for polishing rope snares

These raw materials ~~are~~ are also part of the man's kit:

[283] 1. sinew

2. twine of natural fibers

3. iron fencing wire

[278] 4. supply of poisonous grubs

[237] 5. bone chips for making arrow link shafts

[410] 6. grass stems for arrows

7. wood for bows, poles and spear shafts

224
411 The construction of the hunting arrow will illustrate the complexity of the weaponry. The arrow consists of a mainshaft about 13 inches in length made from the stem of the grass Phragmites communis (Story 1964:94). Into this is inserted a bone linkshaft about two inches long, carved from the humerus or femur of giraffe, kudu, or gemsbok. The linkshaft is joined to the metal arrowhead by a hollow section of grass stem one inch in length. [177] The arrow head is commonly made from iron fencing wire. It consists of a stiff length of wire four to five inches long. The tip of the arrow is beaten into a small triangular blade one half inch from base to apex and five-sixteenths of an inch at the base.

224
411 The butt end of the arrow and the two joints are bound by
strands of sinew. In some arrows the iron shaft itself is
224 bound with sinew. It is the iron shaft to which the arrow
411 poison is applied. Care is taken to avoid spreading poison
278 on the tip of the arrow. The poison is obtained from the
pupal forms of the Chrysomelid beetles Diamphidia sp. and
[415] Polyclada sp. The poison is prepared by squeezing the contents of several pupae into a cup made from the proximal end of the humerus of a large antelope such as gemsbok or kudu. The only additions to the poison mixture observed to be used were saliva and the juice or gum of the several species of Acacia. The use of the latter was optional. Often, without further preliminaries, the Bushmen squeezed the contents of the grub directly on to the iron arrow shaft.

[412] The pupae are mixed with a slender wooden pestle into a thin orange paste, which is then applied directly to the iron arrow shaft using a spatulate applicator especially made for this purpose. The poisoned arrow is then allowed to dry near the fire. After a few minutes it is ready for use.

There are undoubtedly regional variations in the preparation of arrow poison. The ethnographic literature lists at least a dozen substances and recipes that are claimed to be used by the !Kung Bushmen in preparing arrow poison (see Shaw et al. 1963, Story 1964:93).

000 Shaw et al. 1963, Story 1964:93).

224 The !Kung weaponry consists of specialized weapons for
411 killing, retrieving, and preparing different species of game.
The bow and arrow are used to kill only the large antelopes,
kudu, wildebeeste and gemsbok. The thirteen-foot-long
burrow probe is used exclusively for hooking springhare
[223] which sleep in their burrows during the day time. Rope snares
are set to trap small buck such as duiker and steenbok, as
well as the game birds such as guinea fowl, francolin and
224 korhaan. Fire is used in two ways. First it is used to smoke
372 out or asphyxiate wart hog, antbear and porcupine that have
[412] been cornered in burrows. If an animal dies in the burrow,
it is then dug out by means of a digging stick. Fire is also
used during late winter to set bush fires. These fires burn
off the old cover of vegetation and encourage new growth
which will attract game animals to the burned area.

224 The spear is not used as a weapon of attack, but is
411 employed to finish off animals that have been weakened by
[231] poisoned arrows or that have been wounded by the Bushmen dogs.

The knobkerrie (club) is also used to finish off wounded
[223] or cornered animals. Occasionally it is used as a throwing
[231] club to knock down small birds and squirrels. This appears
to be more of a pastime than a serious technique since the
animals knocked down this way are usually fed to the dogs or
just cast aside.

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The pack of hunting dogs is perhaps the most important weapon at the disposal of the hunters. Most men own one or more dogs, but few men have developed and trained an effective hunting pack. The possession of such a pack gives a hunter a considerable advantage in killing. A good pack may number only three dogs. Often two men will pool their dogs and make a temporary pack of four or five dogs. The dogs are the crucial factor in the successful hunting of wart hog. They can run a wart hog to ground where it can be smoked out at the hunter's leisure or they may bring a hog to bay on the surface, attacking and harassing it until the hunter can close in with his spear.

The dogs are equally important in the hunting of steenbok and duiker. A good pack may often run ahead of a hunter and attack and kill the quarry before the hunter has arrived on the scene. This is the most common way that the immature of steenbok, duiker, and wart hog are killed. The dogs are generally helpful in tracking all game where their sense of smell supplements the hunters' remarkable visual acuity. The typical Bushman dog is a small animal (twenty inches tall at the shoulder) of undistinguished appearance. It is a shorthaired breed varying in color from black to buff with many piebald forms. The blood lines are difficult to trace. According to Brian Fagan (personal

224 231 [174] communication), there were no domesticated dogs in the South African Later Stone Age until the arrival of the Bantu. It is not possible to say at present when dogs were introduced into !Kung Bushmen culture. The !Kung themselves say that they have had dogs "since time began".

Data on the hunting success of seven men of the Dobe winter camp will illustrate the importance of dogs in hunting. In July, 1964, during a four week period the seven men of the camp spent a total of seventy-nine man days hunting. Between them they killed a total of eighteen animals. The estimated total weight in meat of these eighteen kills was approximately 434 pounds. Six of the men lacked good hunting dogs. These men accounted for 110 pounds of meat or 25% of the total. The seventh man was the only one with a good hunting pack. With his dogs he killed the remaining 75% of the meat (324 pounds) including four adult wart hog.

[184] Considering the importance of dogs in Dobe area hunting it is interesting that dogs were not used for hunting by the Bushmen of the Nyae Nyae area (J. Marshall 1957; and personal communication).

224 Finally there were several limited techniques that required no specialized equipment. Occasionally men run down immature animals on foot. These are dispatched with a club of any handy piece of wood. Also, on occasion, the men

222 Also, on occasion, the men
262 scavenge meat from carnivore kills. If the day's hunt has
224 been unsuccessful a man may hack a piece of dried hide from
a kill that may be several weeks old. Or, if several men are hunting together they may drive the lesser scavengers such as vultures and hyenas off a fresh kill. Scavenging is not a regular practice. It occurs only if the opportunity presents itself and if there is no other meat forthcoming.

VII. LAND UTILIZATION

361 During 1963-64, the Dobe area was divided into nine territories within which the 15 independent camps were operating. These nine territories together covered about two-thirds of the total area (see Map 14).

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312 There was not a direct relationship between the number of permanent waterholes, the number of territories and the number of independent groups. Although all of the independent groups had access to a permanent water, some of the permanent waters supported several groups, while at other permanent waters independent groups were lacking.

The number of territories and number of groups at each waterhole is shown in Table 6.

[222] At :goše there were four camps but all these camps moved within the same collecting areas. Similarly, for part of the time, there were two camps at Dobe but both camps utilized the same groves of nut trees and the same summer waterholes.

On the other hand, at /ai/ai three of the five camps had their own territories, while two of the camps shared a territory. The jointly occupied territory lay to the north of the /ai/ai waterhole, and the three other camps operated to the west, to the south, and to the east of /ai/ai, respectively.

At the :angwa, Bate, and :ubi waterholes, the situation

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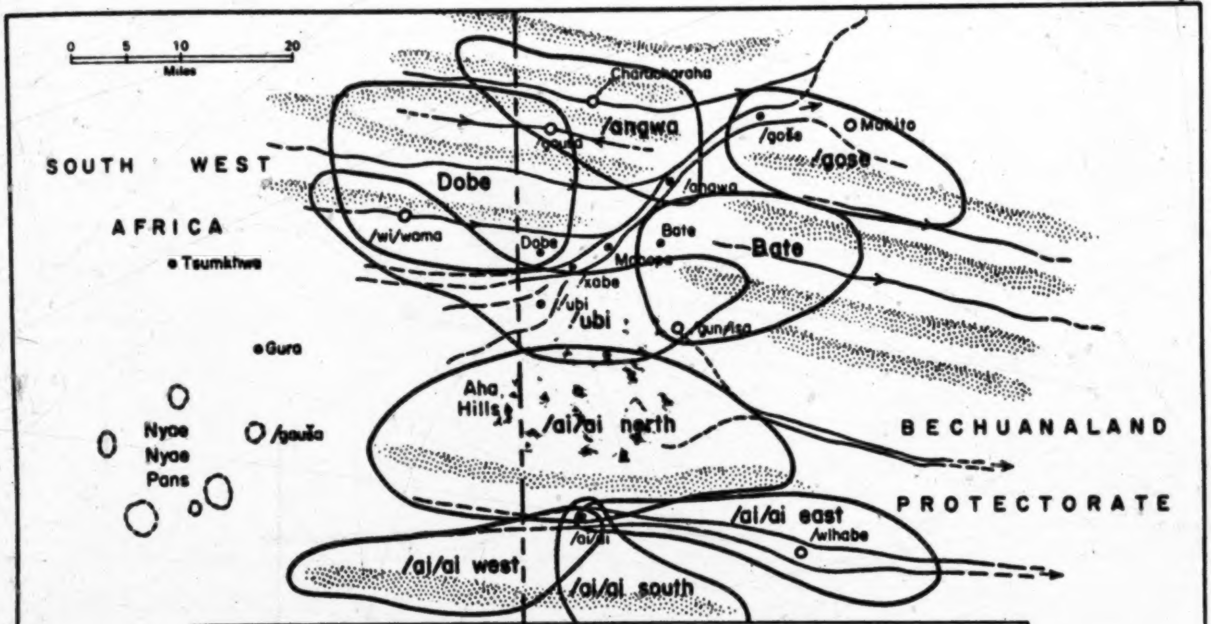
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Mahito
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Tsumkwe
Gura
Aha
Hills
/ai/ai north
Nyae
Nyae
Pans
/gausa
BECHUANALAND
PROTECTORATE
/ai/ai east
/wihabe
/ai/ai
/ai/ai west
/ai/ai south

MAP 14. The nine territorial divisions of the Dobe area Bushmen in 1964

TABLE 6

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The number of camps and the number of territories based on each of the permanent waterholes in the Dobe area.

Name of Waterhole	No. of Independent Camps	No. of Territories
1. !goše	4	1
2. !angwa	1	1
3. Bate	1	1
4. Mahopa	0	0
5. !xabe	0	0
6. !ubi	1	1
7. Dobe	2	1
8. /ai/ai	5	4
	14[1]	9

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[1] The 15th independent group had its permanent waterhole at Tsumkhwe, outside the Dobe area.

361
312 was simple. Each waterhole supported one independent camp and each camp had its own territory.

Two of the waterholes, Mahopa and !xabe, lacked independent camps and therefore were not part of a territory. [648] The Bushmen who drank at these waterholes lived in Bantu [222] villages. They collected food in the adjacent territories of other camps such as Dobe !ubi and !angwa (see Map 14).

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602 The sharing of a single territory by two or more camps reflected the close kinship ties between the camps. This was obvious at Dobe where the leaders of the two camps were a brother and sister who often brought their two groups [562] together to make a common camp. It was also obvious at !goše where the four camps were led by descendants and collaterals of one old woman. In previous years these four independent groups at !goše had lived in one large camp.

361 The territorial arrangements of the Dobe area !Kung Bushmen, like their group structures, were extremely flexible. Most territories overlapped with one or more adjacent territories. The boundaries of territories were vaguely defined and there were areas between territories which were not claimed by any of the camps. The Bushmen did not conceive of territories as areas of exclusive occupation. The concept of territorial defense was lacking. Each territory consisted, in the words of Mrs. Marshall, of "a waterhole and a side" (L. Marshall 1960:334). This point is illustrated in Map 14.

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Each of the groups moves in a "direction" from its waterhole. For instance, the Dobe people move to the west and north, the !angwa people move to the northwest, and the !gose people move to the east.

361 The concept of territoriality as applied to the Bushmen differs from the concept used by zoologists in discussing the spatial arrangements of animals. The zoological usage refers to the exclusive use of space, by an organism or group of organisms who defend this space against competing members of the same species (Bourlière 1964:94-100).

By contrast the Bushmen groups do not defend boundaries and members of all groups travel freely between camps. However, land utilization is not at all a random phenomenon.

[222]
[224]
The Bushmen population is organized into land-holding units, and the members of a unit tend to spend the greater part of the year hunting and gathering within a specific area.

Thus, in the context of this study, the term "territory" refers to the area within which an independent camp moves during the annual subsistence cycle.

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824
[312]
The locations and spatial configurations of territories are determined by the distribution of water and food resources. Each territory has within it a permanent waterhole, one or more seasonal water sources, and one or more mongongo nut forests. Every territory includes, in addition, a selection

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824 of summer foods such as the berries of Grewia spp. and melons of the Citrullus vines, and a selection of winter foods such as roots of the genera Vigna and Coccinia, and edible gums from the genera Acacia, Terminalia, and Burkea.

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824 No two territories have the same constellation of plant foods and no single territory provides the complete inventory of 85 species of plant foods. The Bushmen are well aware of the variations in plant resources between the several territories and there is general agreement on the "strong" and "weak" points of each territory. For instance, !ubi is famous for its Baobab fruits (Adansonia digitata), a food which most other territories lack. /ai/ai is known for the abundance of its wild orange trees (Strychnos spp.) but is considered "weak" in vegetable ivory palms (Hyphaene ventricosa) which are rare south of the Aha Hills. Dobe, on the other hand, is said to be "strong" in vegetable ivory palms and "weak" in the wild orange trees. Bate is famous for its groves of trees bearing the morula nut (Sclerocarya caffra) but is "weak" in trees bearing the mongongo nut
[132] (Ricinodendron rautanenii). Furthermore, local variations in seasonal rainfall may produce an abundance of food in one territory and leave another territory with a food scarcity.

361
433 The important point is that every territory has enough food to sustain at least some of its members throughout the

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433 year, but that territorial arrangements are flexible enough to permit people to collect and eat freely in territories other than their own. Thus there were no instances recorded of the members of one camp going hungry while there was still food available at other camps.

361 Ecologically, the net effect of this flexibility of
433 territories is to produce an equitable distribution of food
602 resources throughout the population. Kinship, real and fictive, is the social mechanism which makes possible this equitable distribution. Each independent camp maintains ties of kinship and marriage with members of every other independent camp. Implicit in every kinship tie is an obligation to share food and water. When relatives are living together, the obligations are manifested in daily exchanges of food and in mutual aid. When relatives are living at
361 different camps these obligations are latent. An individual
433 who visits another camp will invariably set up his or her hut
602
574 beside the hut of the member of the other camp to whom he or she has the closest kinship tie. The visitor is secure in the knowledge that the members of the camp will respect his or her claim to the resources of the area.

The principles of intercamp visiting will be illustrated by an example from the Dobe camp. N!ain!a, a woman about 55 years old, is a member of the Dobe camp. She is a younger

361 sibling of the leaders of the two Dobe camps, and therefore
433 has an unquestionable claim to the Dobe resources. N!ain!a
602 has two married daughters whom she frequently visits. One
574 lives at !angwa and the other at Bate. These two daughters and their husbands make reciprocal visits to Dobe about once a month. N!ain!a has a classificatory uncle at !ubi. During the winter she would make daily trips to collect the Baobab fruits that are available only at !ubi. Her uncle, in turn, would make reciprocal visits to collect the vegetable ivory fruits which are abundant around Dobe. Thus N!ain!a maintains active claims in three of the territories adjacent to her own.

N≠eysin!a (N!ain!a's older brother) is unlike N!ain!a in that he prefers to remain in his home territory rather than visit other camps. N≠eysin!a's kinship ties with members of other camps are numerous but the reciprocal obligations implicit in these kinship ties remain latent because N≠eysin!a rarely visits his relatives in other camps.

361 Inter-territorial visiting is perhaps the most important single principle of land utilization among the Dobe area Bush-
311 men. Concerning land utilization within the individual territory, three significant features should be noted.

First, each of the territories borders on an uninhabited hinterland of indefinite size (see Map 14). Because of this, it is difficult to derive an estimate, in square miles, of the

311 area of each territory.

[312] [824] Second, the area and shape of an individual territory is influenced by the distance between the important resources within it, such as water sources and mongongo nut forests. It is these point resources and not the spaces between them that are the significant features of the landscape.

Third, territories overlap each other and there is disagreement as to the ownership of these overlapping areas. Most Bushmen say that these areas are owned by all, which means, in effect, that they are owned by no one.

Each of these features will be discussed in detail.

1. Hinterland - It was mentioned earlier that the Dobe area [312] was surrounded by a belt of uninhabited country. Except for a few summer months there is no standing water in this belt and, as a consequence, the Dobe area people rarely bother to hunt and gather within it. This outer belt is not lacking [136] [137] in food resources, however. Surveys of the country by Land-Rover indicate that the game and plant foods there are even more abundant than they are within the traditional territories. Why then are these resources so infrequently utilized?

311 312 361 The answer lies in the fact that the Bushmen can usually satisfy their annual subsistence requirements within a radius of 15-20 miles from their permanent waterholes. Whenever possible the Bushmen prefer to make their camp sites at

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361 standing water sources. Since the number of these water sources is limited, it follows that the areas around the water sources will be the most intensively utilized. The Bushmen know how to live on alternative sources of moisture such as *Fockea monroi* but only resort to this subsistence strategy for a week or two at a stretch.

It is a good rule of thumb for the Dobe area that *the intensity of utilization of land varies inversely with the distance from standing water sources*. Since a Bushman group
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221 must spend the six dry months of the year at its permanent waterhole, it is not surprising that the area within a walking radius of this waterhole is intensively utilized. Similarly, since the Bushmen spend three months of the year at the large summer water sources, the areas within a walking radius of these water sources is also intensively utilized. During the brief period in December or January when there is standing water at many localities, the Bushmen can utilize areas that lie *beyond* a walking radius of the major water sources.

These three levels of intensity of utilization are illustrated schematically in Map 15. This scheme disregards for the moment the actual pattern of distribution of food resources peculiar to each territory. The shaded circles enclose all of the areas that are within a six mile radius of a permanent waterhole. These are the only areas that can be reached by

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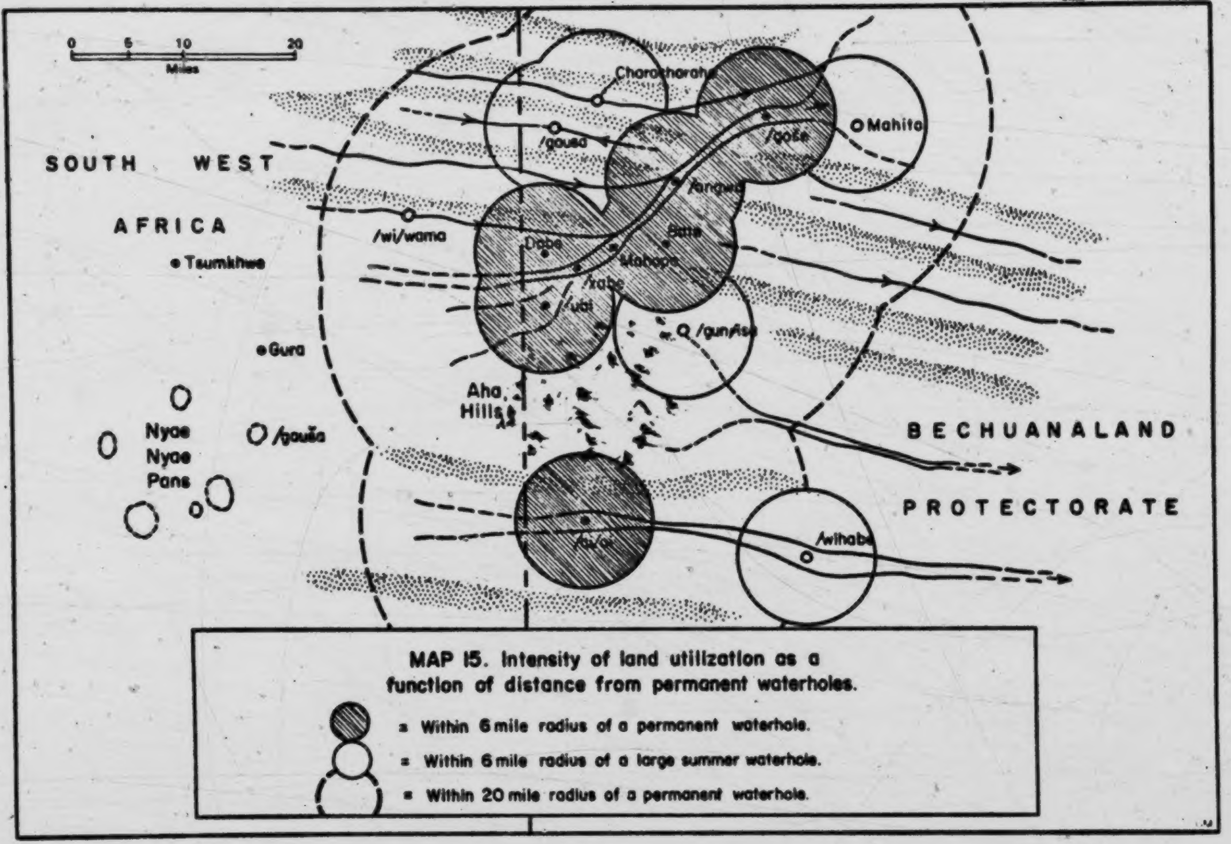
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BECHUANALAND
PROTECTORATE

MAP 15. Intensity of land utilization as a function of distance from permanent waterholes.

= Within 6 mile radius of a permanent waterhole.
= Within 6 mile radius of a large summer waterhole.
= Within 20 mile radius of a permanent waterhole.

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a round trip hike of 12 miles or less.

The distance of 12 miles was chosen for this illustration, because this was close to the maximum distance that the Bushmen were willing to walk in a single day of food gathering. In the previous chapter it was mentioned that Bushmen hunters and gatherers do not stay away from their camps overnight. Therefore an individual hunter or gatherer will confine the day's activities to within a limited radius of his or her camp. These expressed preferences set the limits on the size of the winter areas of intense utilization.

A similar situation exists in the areas that are within a six mile radius of the main summer water sources. These are represented on Map 15 as unshaded circles. These further areas are intensively utilized during the summer months.

These areas of intensive utilization are surrounded by a belt of country that lies within a twenty mile radius of the permanent waterholes. Twenty miles was the average maximum distance from permanent water that the Bushmen were observed to range. This belt is enclosed by a dotted line in Map 15. It should be noted that the Bushmen groups spent on an average less than one month of the year working these areas. The great majority of their time was spent closer to the standing water sources.

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The Dobe area Bushmen were not observed to make camps

311 361 beyond the area enclosed by the dotted line, and this line therefore accurately represents the total utilizable space of the Dobe area.

311 312 361 824 2. *Point resources* - In Map 15, the picture of land utilization was simplified by omitting the actual patterning of food resources. In fact, the extent and configuration of the intensively utilized areas is influenced by the location of the mongongo nut forests and the distance of these forests from the permanent waterholes. These resources are plotted in Map 16. For instance, in an area where the mongongo nuts within a walking radius of water are sufficient to support a camp throughout the year, a group's territory will be small. However, in an area where the mongongo nuts are less locally abundant, the territory must, of necessity, be much larger.

The people of !goše, for example, are fortunate in having a vast nut forest within a ten mile radius of their waterhole. [162] The nuts from this forest are abundant enough to support the 62 members of the !gose camp throughout the year. By contrast, the nut forests near Dobe are much less abundant than at !goše. [162] The 36 members of the Dobe camps have to walk farther (up to 18 miles at the end of the dry season) in order to collect the mongongo nuts. As a result, the effective annual territory of the Dobe people is larger than that of the !goše people, despite the fact that the population of Dobe is smaller than

[TEXT CONTINUED ON PAGE 147]

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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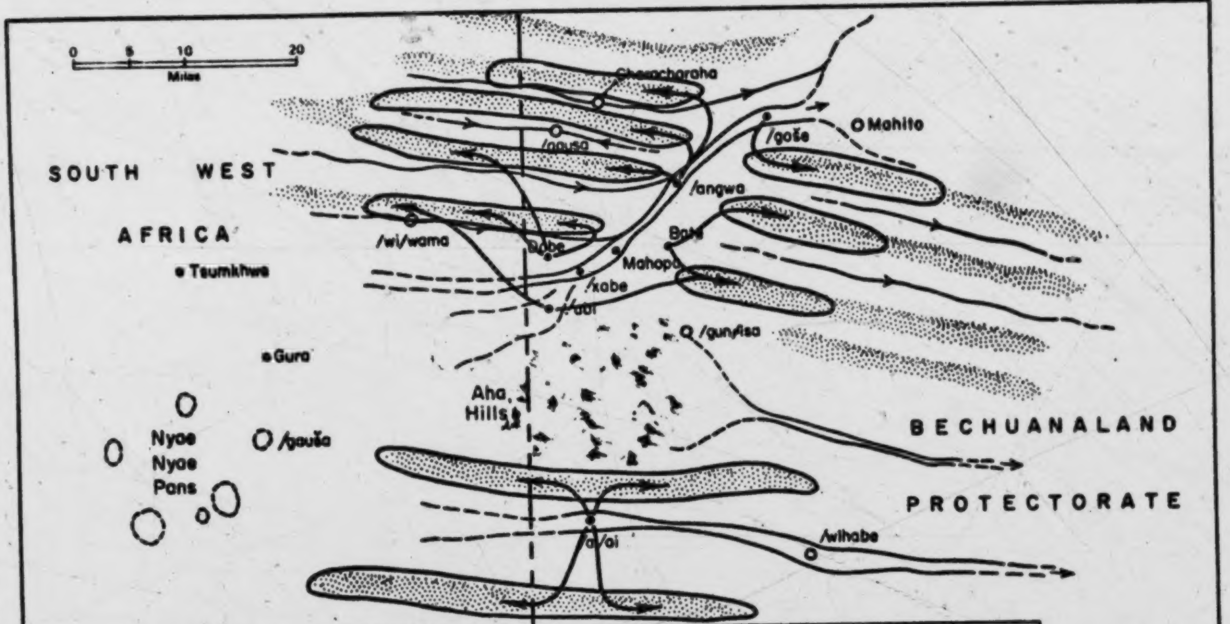

0 5 10 20
Miles
SOUTH WEST AFRICA
Tsumkhwe
Gura
Nyae Nyae Pans
/gauša
Chasacharaha
/gausa
/goše
Mahito
/angwa
/wi/wama
Dobe
Bate
Mahopa
/xabe
/ubi
/gun/isa
Aha Hills
BECHUANALAND PROTECTORATE
/ai/ai
/wihabe

MAP 16. The mongongo nut forests intensively utilized by the Dobe area Bushmen.

⬭ = Mongongo nut forests.

311
312 the population of !gose (this is illustrated in Map 14 as well
361 as in Map 16).

A further example will serve to illustrate how point resources influence the size of territories. It was mentioned above that each territory contains one or more large summer water sources. In most cases these summer waters are less than 12 miles from the permanent waterholes. In one case, however, the summer water is 23 miles distant from the permanent waterhole. The summer water at /wihabe belongs to the group of 27 people that works to the east of /ai/ai (see Map 14). This group lays claim to the land between /ai/ai and /wihabe. But they do not utilize this area in their subsistence activities. Rather they hike through it in order to move from one point resource to another, i.e. from their winter water at /ai/ai to their summer water at /wihabe.

3. Territorial overlap - Territories are so loosely defined by the Dobe area !Kung that certain areas are claimed by none of the camps and consequently are utilized by everyone. Wherever territories adjoin, there is a belt of "no-man's land" for which no one is prepared to make a definite statement of ownership. This uncertainty is usually expressed by informants as follows: "The owners of this land died long ago, today we don't know who owns it."

The Aha Hills illustrate this territorial overlap. The

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312 hills hold standing water only during the summer months.
361 During this season, the members of two /ai/ai camps, the !ubi
[628] camp, and the Bate camp mingle freely at its water sources.
This mingling of groups also occurs at some of the large summer
pans such as !gauša and čharačharaha where members of different
winter groups come together for weeks or even months.

The foregoing discussion has highlighted the flexible nature of !Kung Bushmen territoriality. This flexibility is manifested in the frequency of visiting between waterholes, the vagueness of territorial boundaries and the existence of food areas that are said to belong to nobody.

VIII. WATER AND THE SEASONAL ROUND

133 137 The Kalahari desert is not a food poor area. Most of it is situated between the 10 and 20 inch isohyet and therefore it is marginal for cultivation (without irrigation), but the desert supports a remarkable abundance and variety of edible wild plants which have become genetically adapted to arid conditions.

Geographers have classified the Kalahari as "desert" because of the lack of surface water (Wellington 1955 etc.). This in turn is a function of the sandy terrain which supports surface water only during a brief summer season. In the few localities where the underlying geological formations are exposed, permanent standing water is found. And these point sources of water are usually surrounded by waterless belts of 812 up to 200 miles in width. Edible plants on the other hand 824 are widely distributed both in the immediate vicinity of water 433 221 and at considerable distances from it. The geographical separation of food and water in certain seasons is the critical problem of !Kung Bushman subsistence.

This is not a major problem during the rainy season when seasonal standing water may be found in close proximity to the concentrated food resources. Nor is this a major problem during the early winter when food is available around the

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permanent water sources. Nevertheless for one season every year Bushmen must face a situation in which major foods and permanent water are a considerable distance apart. How Bushmen arrange their lives to meet this situation will be illustrated by data from the Dobe area !Kung Bushmen.

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According to the Bushmen, water has always existed in the eight permanent waterholes of the Dobe area. Seven of these waterholes are situated in or near the dry bed of one molapo, the !angwadum. The eighth, 25 miles to the south, is in the bed of another molapo, the /ai/aidum. These molapos lie in the center of a belt of flatlands which varies in width from 5-10 miles. It was pointed out in Chapter IV that the molapos interrupt the basic system of parallel dunes that cover most of the northwestern Kalahari. But it is only on these dunes that the primary Bushman food, the mongongo nut, is found. The result is that each of the eight waterholes is three to seven miles distant from the nearest grove of mongongo nuts. Thus gatherers who are camped at a permanent water must make a minimum daily round trip of six to fourteen miles in order to gather mongongo nuts. As the nearest nuts become exhausted the round trip distance becomes greater and greater, until it reaches a distance that is too far to walk in a day. This distance varies from camp to camp but 12 miles (6 miles out and 6 miles returning) was close to the maximum that the

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824 people were willing to walk in a single day for the purpose
222 of food gathering. In order to exploit food resources further than seven miles from water, the Bushmen feel that it is necessary to make a temporary camp at the food and stay overnight.

312 The options available to Bushmen facing such a situation
222 are three: 1) they may carry water to the food and live there until their water is exhausted; 2) they may move to the food and dig water-rich roots to satisfy their moisture requirements; or 3) they may wait until rainfall produces standing water nearer the desirable foods.

312 There are no physiological short cuts to solving the
147 water problem. There is no evidence that the Bushmen's daily water requirements are less than that of other peoples (Wyndham in press; Silberbauer 1965). Like all peoples, the Bushmen must drink water to live and their daily requirements are a function of such factors as ambient air temperature, wind velocity and the work they have to do[1] (Ladell 1958; Adolph et al. 1947).

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[1] Ladell, a physiologist specializing in problems of human life in arid regions has said: "It can be categorically stated that no man of any race, however acclimatized and trained, can survive in a hot desert climate without very liberal supplies of water; there is, and can be, no substitute for water and there is no remedy for its deficiency". (1958:85).

312 221 The availability of water can be regarded as the most important determinant of Bushman subsistence activities. A season by season account of these activities will serve to illustrate how subsistence strategies take maximum advantage of water sources. The annual subsistence cycle is described under six headings:

1. First rains
2. Main rains
3. Autumn
4. Early winter
5. Late winter
6. Spring

1. First rains

The onset of the first rains finds the Bushmen clustered [361] around their permanent waterholes. It is this time of year [574] that camp membership is most stable because all areas are short of food and there are fewer incentives for visiting [132] other camps. Also the weather is hot with mean daily maxima of 100°F and walking is uncomfortable.

312 221 824 Food, in the vicinity of permanent water, is in short supply. Fruits, berries, melons and leafy greens, which appear only during the main rains, are nowhere available. The mongongo nuts are still abundant but are found only at distances of ten or more miles from the permanent waterholes. The diet

312 221 at the waterholes consists primarily of roots and bulbs of the
824 genera: *Eulophia*, *Vigna*, *Walleria*, and *Coccinia*, and the edible sap of *Acacia* spp. and *Terminalia sericea*. It is this time of year that the heart of the dwarf vegetable ivory palm is eaten,
[164] (*Hyphaene*). Those who eat its fibrous pulp experience stomach cramps and diarrhea, but, as the Bushmen say, it make one's "mouth work" and gives one a sensation of a full stomach.
221 Hunting is arduous business in the heat and men who go out in
224 the early morning find it necessary to spend the mid-day hours resting in the shade. The principal animal killed is the springhare.

132 The first rains are convectional thundershowers. Their distribution is spotty. A storm may briefly inundate one area and miss entirely another area only a mile away.

312 The Bushmen observe the storm clouds travelling across
222 the horizon and try to judge where the showers have drenched
[821] the ground. They then set out in family groups in the direction of the rains. If they find that water has collected in the hollows of mongongo trees, they will stay in the nut groves for several days and eat nuts until the water is exhausted. They then fill their karosses with nuts and return to the permanent water. If, on reaching the nut groves, they find that no water has collected they will be forced to fill their karosses with nuts and return to camp the same day. In certain areas

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222 where the water bearing root Fockea monroi is available the Bushmen may extend their stay in the nutting groves by eating the juicy pulp of this root. If they are fortunate, this water source may tide them over to the next shower, part of which will accumulate in the hollows of trees.

13 The first rainfall, however brief, appears to have the general effect of triggering reproduction in animals, and initiating the growth phase in plants. Among the first of the summer foods to appear are the leafy greens Dipcadi glaucum and Talinum crispatulatum.

132 There is no well-defined boundary between the first rains of October and the main rains. J. Marshall mentions that during his periods of field work a gap occurred between the first and the main rains. In 1963 and 1964, however, the showers gradually increased in intensity and frequency from [433] October through December. The date of onset and the intensity of rainfall varies greatly from year to year and a delay of even a few weeks in the onset of rain can cause considerable hardship amongst the Bushmen. Furthermore, an initial rain followed by weeks of dry weather is a mixed blessing, for it brings the plants prematurely into leaf and they become scorched and damaged by the subsequent sunshine.

In 1963, the first rain fell on 8 October. In 1964, it did not fall until the 11 November and one noticed that the

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433 physical condition of the Bushmen was visibly poorer in November 1964 by comparison with November 1963.

2. Main rains

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[821] The Bushmen say that a series of intense downpours (measuring 2-3 inches) heralds the beginning of the main rains and ushers in their season of abundance. Such a fall occurred in 1963 at the end of November. The immediate effect of these downpours is to produce standing water in the small molapos that lie in the interstices of the dunes. When these seasonal waters become established, virtually the entire Bushman population moves out to live at them. Thus from December through March the permanent waterholes are largely deserted.

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222 With the coming of the main rains, the summer foods begin to ripen. These foods appear around the summer water sources and they appear also around the permanent waterholes. It is significant, that, although foods become available at the permanent waterholes, the Bushmen tend to avoid these foods. They prefer to eat the foods that are around the summer waters. This illustrates one way that the Bushmen take maximum advantage of the more distant foods. They defer exploitation of the foods around the permanent waterhole until the winter when the alternative water sources have dried out.

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361 The distribution of camps during the summer follows two phases. In the early phase when water is standing in a dozen or more localities camps are found at most waters. This is the time of maximum freedom of movement because ponds fill up in the usually waterless belts and make it possible for people to visit relatives 35-70 miles away.

The distribution of camps in December 1963 is illustrated in Map 17,,p.157.

The second phase of summer life begins as these smaller waters dry up in February and March. Then most of the Bushmen converge on the large summer waters such as !Gauša Pan (not to be confused with /Gauša Pan in the Nyae Nyae area).

!Gauša Pan in its peak season (Jan-March in 1964) was a pond 400 feet long and 125 feet across, located in a local
[162] drainage area between two dunes. In addition to a resident
[648] population of 40 Bushmen (augmented by dozens of temporary visitors) the pan supported four Bantu cattle posts with
[136] about 500 head of cattle. The pan was a watering place for kudu and wildebeeste and had resident flocks of red-billed teal, white-bellied stork and hammerkops. Within a 3 mile radius of the pan there were remains of at least ten abandoned Bushmen camps that had been occupied in previous years.

[162] Besides !Gauša there were four other big pans in the Dobe area, each of which supported large Bushmen camps (of

[TEXT CONTINUED ON PAGE 158]

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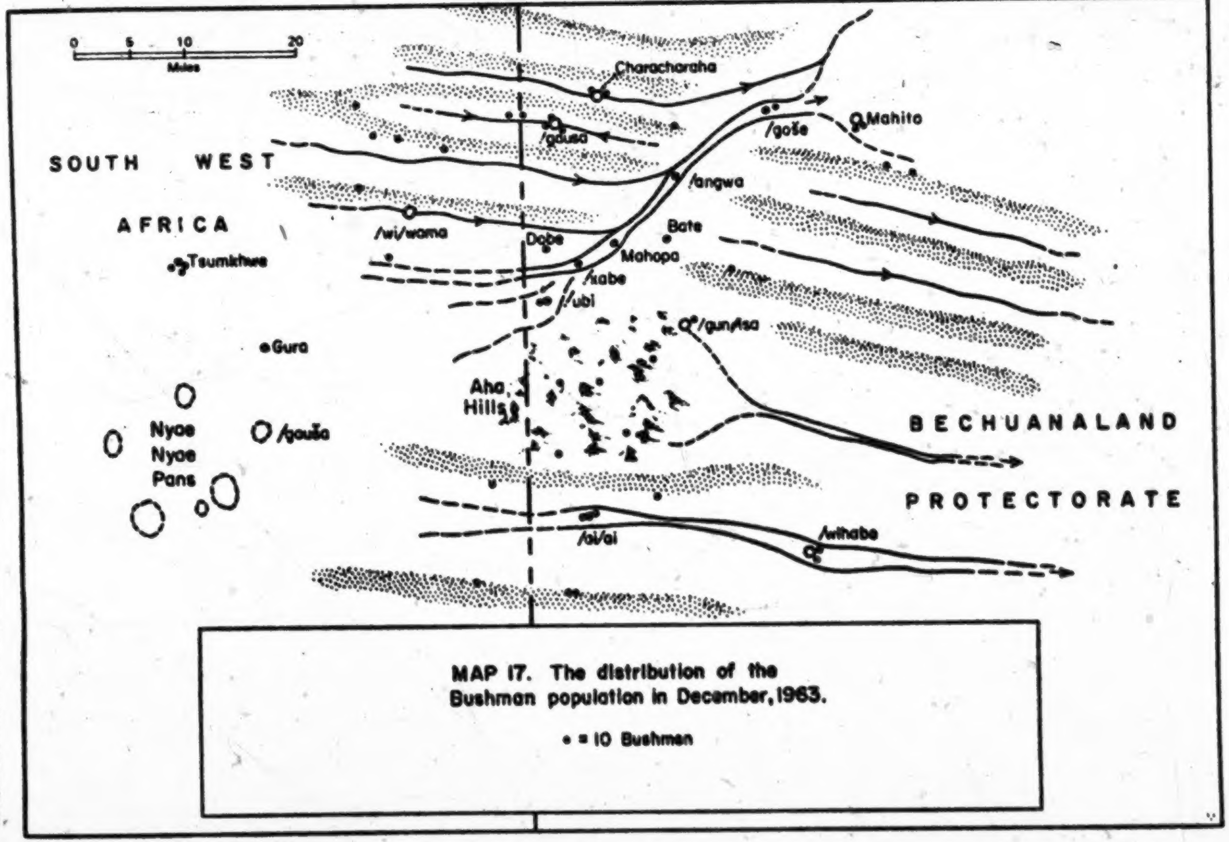
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/gun/Asa
Gura
Aha Hills
Nyae Nyae Pans
/gauša
/ai/ai
/withabe

MAP 17. The distribution of the Bushman population in December, 1963.

• = 10 Bushmen

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312 30 or more people) and Bantu cattle posts. These were located
361 at Characharaha, Mahito, !gun≠isa and /wihabe. Map 18 illus-
[162] trates the distribution of population during the late summer
(March 1964), p. 159.

221 Life at the summer pans is, by Bushman standards, luxur-
137 ious because all of the major and minor fruits, berries,
433
222 melons and leafy greens become available. There is a succession of ripening of the major foods throughout the summer months. The first to ripen are the leafy greens (Dipcadi and Talinum), followed by the sour plums (Ximenia caffra and X. americana), then the melons (Citrullus lanatus and C. naudinianus), and the Grewia berries (Grewia flava comes first followed by six other species). By the time the plums have become scarce the melons are ready for eating. As the melons become worked out the Grewia berries ripen. Each of six species of Grewia comes into ripeness at a different time, so that every two weeks throughout the middle of summer another species of Grewia became ready for eating. Throughout the early part of the summer the mongongo nuts are available but these are the nuts from the previous year's fall. It is not until April that the current year's fall of nuts occurs. And then a new cycle of working out from the camp occurs. This illustrates again the selective gathering habits of the !Kung Bushmen.

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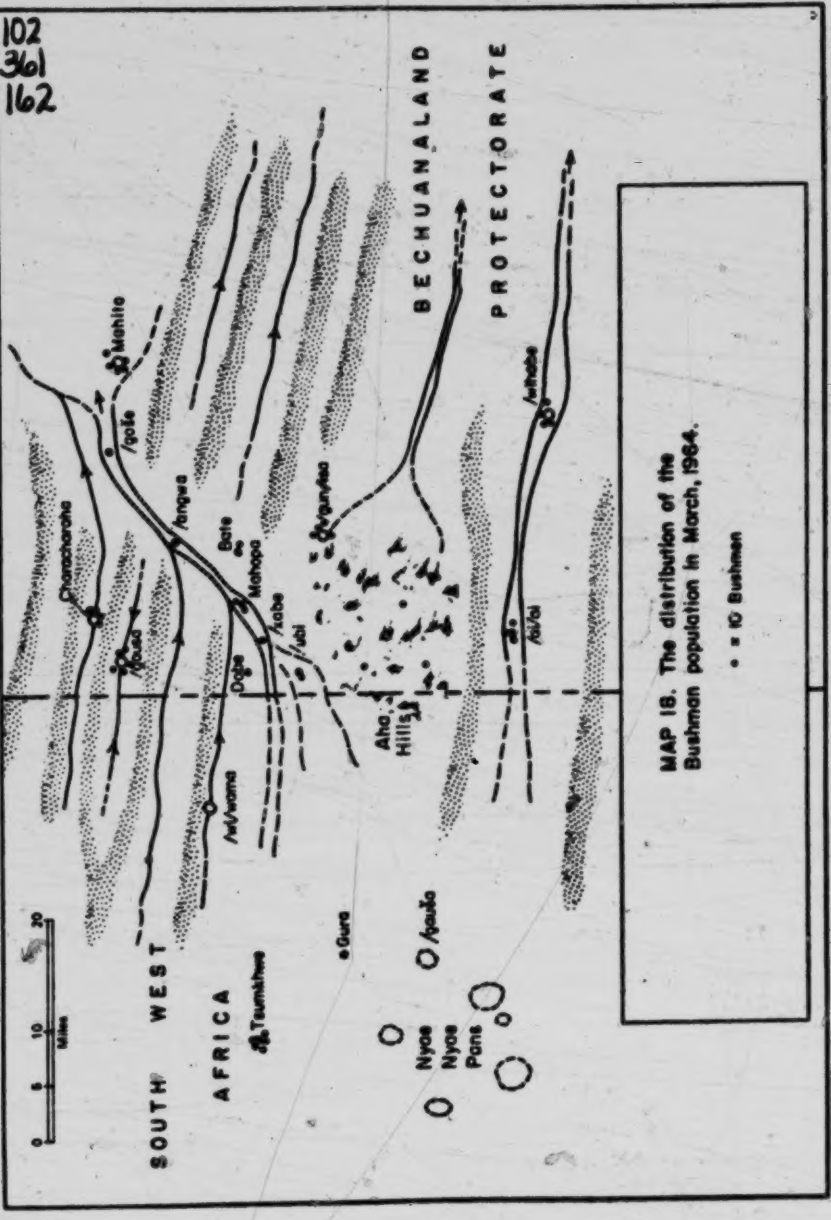
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Guru
/gautsa
Nyae Nyae Pans

MAP 18. The distribution of the Bushman population in March, 1964.

• = 10 Bushmen

824
222 Citrullus lanatus - the well-known "tsamma" melon was one of the superabundant foods. It was intensively exploited throughout the mid-summer until it was exhausted within a radius of five miles of the !Gausa Pan. This is a remarkably successful plant around the areas of human habitation. It is an annual (Story 1964:20) and will sprout from seed wherever the pips have been discarded. It is interesting that the Bushmen do not consider cultivating this melon, a common practice among the neighboring Bantu.

Grewia flava berries were superabundant in the vicinity of !Gausa and Characharaha. The amount a woman could bring home was limited only by the speed at which she could pick them from the five-foot tall bushes. In addition, six other species of Grewia were locally available: (G. bicolor, G. flavescens, G. avellana, G. falcistipulata, G. retinervis, and G. subspathulata). It is interesting that, because G. flava has the tastiest berry of all the Grewias, the other six species were largely ignored until the G. flava had been exhausted within a six mile radius of !Gausa.

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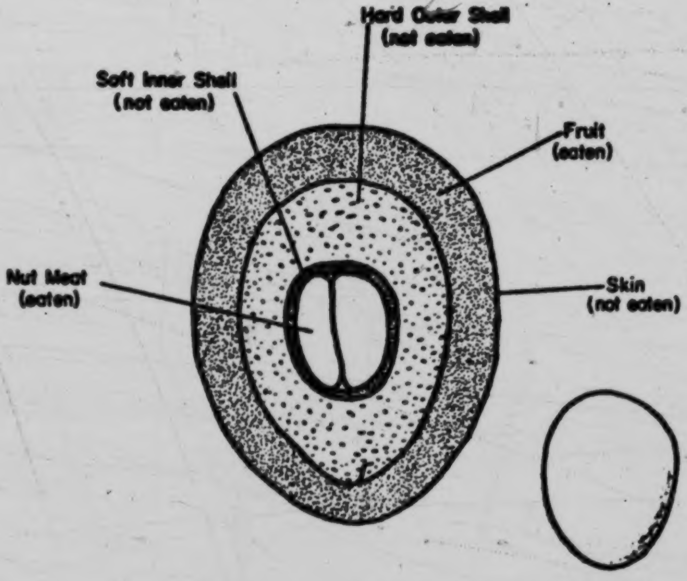
262 When the new crop of mongongo nuts falls, the gatherers can ignore the ~~previous year's crop~~. The mongongo nut has two edible portions: an outer fruit and an inner kernel. Figure 3 on page 161 shows a mongongo nut in cross section magnified four times to show detail. The outer layer of skin

[TEXT CONTINUED ON PAGE 162]


Hard Outer Shell
(not eaten)
Soft Inner Shell
(not eaten)
Fruit
(eaten)
Nut Meat
(eaten)
Skin
(not eaten)

Cross section — Enlarged

Actual size

FIGURE 3.
MONGONGO NUT (Ricinodendron rautanenii)

824 is not eaten. Next is a casing of granular-textured fruit
262 which is eaten. The fruit encloses the nut itself. This
consists of a thick outer shell which must be cracked open
with the nut-cracking stones. Within the thick shell is a
softer inner shell which encloses the nut kernel which is the
staple of the Bushman diet. This inner kernel is "packaged"
within four protective layers and this explains its remarkable
storage properties.

824 In the late summer and autumn months the Bushmen eat
252 large quantities of both the fruit and the nut. First the
women boil potfuls of whole fruit in order to separate the
outer flesh from the hard shell. The flesh of the fruit
produces a delicious fruit puree that tastes like stewed
prunes. After the fruit is eaten, the nuts themselves are
set aside for later cracking and eating.

184 The summer hunting situation appears to vary from camp
221
224 to camp. At the !Gausa camp very little hunting was done.
[177] The resident men assisted the Bantu in cattle herding and they
[648] received calabashes of sour milk as payment. At Characharaha
[464] the men hunted more, killing gemsbok, python and porcupine.
At one summer camp, Mokoro, where there were no Bantu resident,
two young men killed four large buck in the space of one
month (two kudu and two gemsbok). This Mokoro camp was an
[177] unusually successful one. The availability of cows' milk and
meat no doubt lessens the men's incentive for hunting

000 meat no doubt lessens the men's incentive for hunting.

221 3. Autumn - which fell (in 1964) during April is the period
312 when these large summer waters are drying up. One by one the
361 big pans turn into muddy pools and the Bushmen abandon them. Some of the people join the camps established at the remaining summer waters while others fall back to their permanent waterholes in the main molapos.

!Gauša was the last of the summer waters to go dry. It was finally abandoned by May 1, 1964. By this date all the Bushmen had returned to the permanent waters and this marks the beginning of the winter subsistence cycle.

As mentioned previously the present study was made during a drought. There are indications in the literature that summer waters do not always dry out as early as May 1. The Bushmen themselves spoke of summer water persisting in previous years into the period of frost which does not come until June or July. It is also probable that the presence of Bantu cattle contributed to the premature drying out of the summer waters. However, these hypotheses cannot be tested except by further field work.

4. Early Winter

221 The winter season is not coterminous with the period of
312 food scarcity. This scarce period does not begin until mid-
433 winter and continues until the first rains. The first half

221 of winter from May to mid-July is a period of relative abun-
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433 dance. This is due to the fact that the permanent waters
[361] have not been occupied during the summer months, and there is abundant food in their vicinity when the Bushmen return to
[824] them in May. Subsistence has a double base, including both the tail-end of the summer foods such as the Grewia berries, and the first series of winter roots and bulbs. Mongongo nuts are also locally available. The distribution of the Bushmen population during the winter of 1964 is shown in Map 19, p. 165.

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824 The root foods are generally associated with the winter subsistence. This is curious because as perennials the bulbs may be dug out at any time of the year. But the Bushmen do not concentrate on root foods during the summer months: they pass them over in favor of the foods of shorter duration, the fruits and melons. They state that they do not like the flavor of the root foods during the winter.

In May and June these root plants are exploited and the pressure on them increases through the winter as the nuts become locally exhausted. The major roots are Eulophia spp., Vigna dinteri, Walleria muricata, Coccinia spp., Coccinia rehmannii and Ceropegia spp. - nine species in all. These have edible bulbs or storage organs which range in size from one to three inches in diameter.

[TEXT CONTINUED ON PAGE 166]

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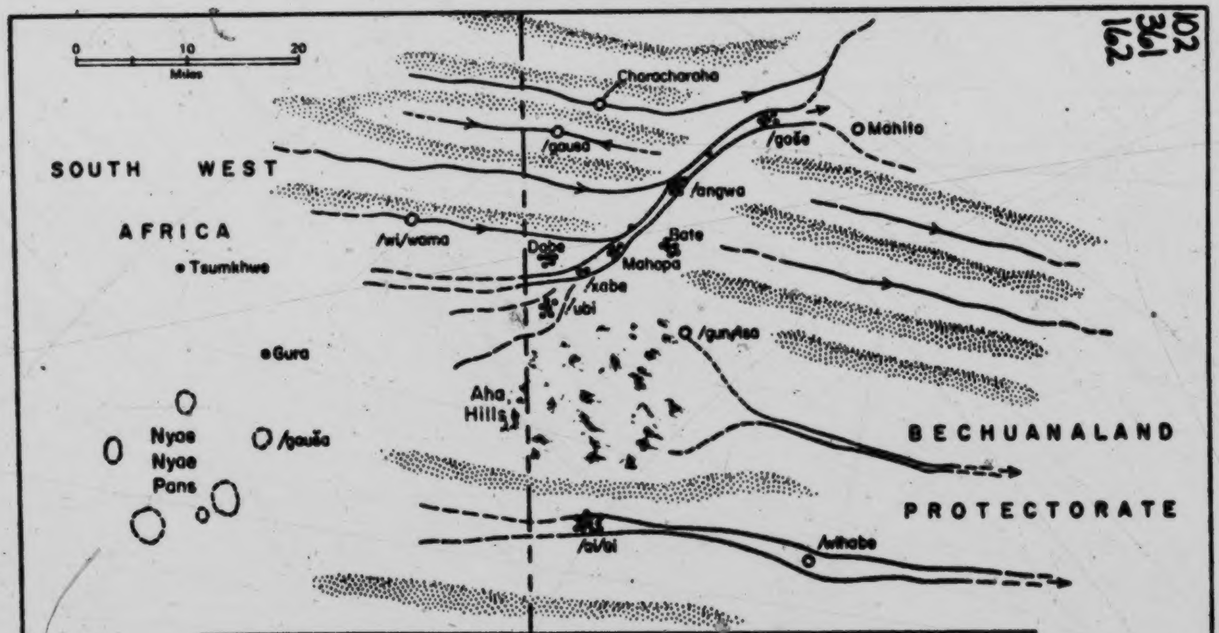
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Tsumkhwe
/xabe
/ubi
/gum/isa
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Aha
Hills
Nyae
Nyae
Pans
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BECHUANALAND
PROTECTORATE
/ai/ai
/whabe

MAP 19. The distribution of the Bushman population in July, 1964.

• = 10 Bushmen.

221 224 Winter is the snareline season. Each hunter who is wintering in his home territory starts to build his snarelines in May and continues to refine and improve the lines 224 until the end of August when they are abandoned. The snareline is built up as follows: the hunters of a camp agree beforehand where each man will set up his lines. A man surveys his snaring area for fresh tracks of steenbok which is the major animal snared. He gradually lays down an unobtrusive line of brush 600 to 900 feet long. The line zigzags from bush to bush until by degrees he closes off a tract of ground with a brush barrier. The object of this operation is to habituate the animals to cross his line at a limited number of gaps. Each day he inspects his line for fresh tracks. If the animals are breaching his line regularly at one gap, he then sets a rope snare in the gap.

The snare consists of a 3 foot length of rope, at one end of which is a noose. This noose is spread apart on the ground by a series of pegs. The center of the noose has a trigger. When the forefoot of an antelope falls within the noose the trigger is released. The other end of the noose is tied to a trimmed sapling. The sapling is bent in a taut arc. The animal crossing the gap steps into the noose and releases the trigger. When the trigger is released the sapling snaps back sharply and the noose tightens around the animal's foot.

224 The snared animal is not injured. It hangs suspended on the rope and struggles to break free, but if the hunter has tied his knots well he will arrive on his daily inspection to find the snared buck thrashing around the sapling. He then dispatches the buck with a club or spear, repairs the damage to the brush fence, and resets the snare.

At the height of the snaring season each hunter will have three lines in operation. Each line will have 7-9 gaps set with snares. The Dobe camp hunters who had set 20-25 separate snares averaged one small animal per hunter per week throughout the winter. A hunter's success in snaring depends upon his interpretation of game tracks and the patience with which he habituates the animals to crossing his lines where he wants them to. The hunters operate snarelines only in the winter because at other times of the year both the hunters and the quarry are ranging farther into the desert and the men do not remain long enough at one camp to build and maintain the snarelines.

[278]
[231] In addition to the snarelines, the hunters carry out a full range of hunting activities including big game hunting with poison arrows, hunting wart-hog with dogs, and probing burrows for springhare, porcupine and antbear.

Table 7 lists all the kills made by the hunters of the Dobe camp during the 28 day period from 6 July to 2 August 1964.

TABLE 7

221 224 231 433 The kills made by the hunters of the Dobe camp during a 28-day period (6 July to 2 August 1964).

Date	Hunter	Species	Technique	estimated weight of meat
July				
7.	≠oma	wart hog	with dogs	80 lbs.
7.	≠oma//gwe	steenbok	snare	12
9.	/ase	steenbok	snare	12
17.	≠oma	wart hog	with dogs	80
20.	≠oma	wart hog	with dogs	80
20.	≠oma//gwe	honey badger	snare	10
20.	≠oma//gwe	python	collected	20
21.	/ase	steenbok	snare	12
23.	n≠eysin!a	steenbok	snare	12
23.	≠oma//gwe	hare	snare	3
24.	≠oma	bat-eared fox	with dogs	4
27.	/ase	hare	snare	3
27.	≠gau	korhaan	snare	2
27.	n≠eysin!a	korhaan	snare	2
28.	≠oma	wart hog	with dogs	80
29.	≠oma//gwe	kori bustard	snare	10
30.	n≠eysin!a	steenbok	snare	12
31.	/ase	porcupine	cornered in burrow	20
				454 lbs.[1]

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[628] [1] In addition to the meat from these 18 kills, the Dobe Bushmen received gifts of meat from other camps. The weight of meat from these outside sources is estimated at 36 lbs. Therefore, the total meat eaten at Dobe was around 490 lbs.

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[162]
[361] There were nine adult men resident at this camp but only seven did any hunting. The eighth man was blind and the ninth was crippled. The seven hunters were n≠eysin!a (60 yrs.) and his son ≠oma (35 yrs.); ≠oma//gwe (65 yrs.) and his three sons /ase (40 yrs.), ≠gau (35 yrs.), and n≠eysi (27 yrs.); and ≠gaun!a (40 yrs.), the son-in-law of n≠eysin!a.

[231] The most successful hunter, ≠oma (35 yrs.), hunted 16/28 days and killed four wart hogs and a bat-eared fox, all killed with the aid of dogs. Next was /ase (40 yrs), who hunted nine days. He snared two steenbok and a hare and killed a porcupine by cornering it in its burrow and digging it out.

Then there were the two old men both of whom hunted 16 days each. ≠oma//gwe snared a steenbok, a honey badger, a hare and a kori bustard, and collected a python. N≠eysin!a snared two steenbok.

Old ≠oma//gwe's two younger sons hunted nine and eight days, respectively. The older of the two, ≠gau, snared one korhaan; the youngest son, n≠eysi, also snared one korhaan.

Finally old n≠eysin!a's son-in-law, ≠gaun!a, hunted four days but killed nothing.

[146] The seven men hunted a total of 79 man-days and killed 18 animals; the total weight of meat is estimated at 454 lbs. In addition, they received gifts of meat from other camps

224
146 totalling 36 lbs. This meat (490 lbs.) went to feed a camp of 42 people (exclusive of visitors).

A rough calculation of the weight of meat per person per day through this 28-day period gives a figure of 6-2/3 oz. of meat. The daily intake of vegetable foods per person during the same period can be estimated at 24 oz. (of mongongo nuts and various roots). Therefore a reasonable estimate of the ratio of meat to vegetables in the diet of this camp is 25%-75%.

This ratio is based on observations at one camp during [114] one season only. It can be said, however, that George Silberbauer, Laurence and Lorna Marshall, and the author are in general agreement that meat comprises between 20% and 40% by weight of the Bushman diet (Silberbauer, 1965:28; Marshalls, personal communication).

5. Late Winter

221 There is a well-defined break point in the winter subsistence cycle between the early period (May, June and July) of relative abundance and the late winter and spring period 221 of increasing food scarcity (August-September). Through the 222 462 early winter the Bushmen concentrate on the mongongo nut groves that are within a day's walk of permanent water. Groups of women go out once every three or four days, fill their karosses with nuts and return to the camp in the evening. The men

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222 during this period concentrate on tending their snarelines.
[462] Gradually the distance to the nuts increases as a wider and
[224] wider radius of nuts becomes eaten out. For instance, by the end of July there were no nuts within seven miles of the Dobe waterhole, and a day's collecting became a major undertaking. In order to reach the nuts, the women had to set out early in the morning and walk for 2-1/2 hours. In the nut forest they had to work for two hours to fill their karosses
[482] with nuts. On the return journey each woman was heavily loaded with c. 30 lbs. of whole nuts and the distance back to camp took 3-1/2 hours to cover. Thus on a late July collecting trip, the women would have to walk at least 14 miles to and from the nuts, plus another two miles in the nut forests, stooping and collecting. This adds up to eight hours of hard work in one day.

At this point, the effort required to gather mongongo nuts begins to outweigh the satisfaction derived from eating nuts and one observed a sharp decline in nut collecting in favor of the less desirable foods of classes II, III and IV. These latter foods had the advantage of being locally abundant in the vicinity of the permanent waterholes.

This transition from nuts to other foods occurred at Dobe
[184] at the end of July (in 1964). At !gose, where the nut forests are much denser, the gatherers continued their daily trips

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222 well into September. On the other hand, at /ai/ai, where 109
184 Bushmen were living, the local mongongo nuts were exhausted at the beginning of July.

Since each territory was known for a different selection of winter foods, the transition took a different form at each waterhole. At Dobe, the mongongo nuts were replaced as the staple of the diet by Baobab fruits (*Adansonia*) and vegetable ivory palm hearts (*Hyphaene*). At Bate the people shifted from mongongo nuts to *Sclerocarya caffra* nuts. At !angwa, the people concentrated on collecting *Acacia* spp. gums.

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146 In general the diet of the Bushmen becomes much more eclectic during the latter half of the winter. It was during this season that the Bushmen took advantage of a wide selection of edible species. Instead of eating mongongo nuts with a few other species as "side dishes", the people had to diversify their diet in order to live well. During August and September no less than 25 species of roots, bulbs and edible gums formed the basis of the diet.

222
312 There was an alternative strategy to eating less desirable foods. If a family was prepared to make the effort required to reach the nutting groves, they would fill their water containers (ostrich egg shells and the stomachs of antelope) and walk to the nuts. They would collect and eat there until

222 312 their water was exhausted. Water could only be carried out in sufficient quantities to support a family for two or three nights, so that at noon of the third or fourth day, a family was forced to return home.

312 The ability of a group to live away from a waterhole is strictly limited by its capacity for hauling water. The ostrich egg shell has an average capacity of 36 ounces (U.S.).[1] The contents of two eggs (72 ounces or 2-1/4 quarts U.S.) supplies the minimum daily fluid requirements of one adult. Bushmen informants consistently spoke of two eggs-ful as their minimum daily ration. When well-water was available, the Bushmen were observed to drink more than 72 ounces per day. Irven DeVore made a four-day study of the water intake of a group of 15 people in November, 1964. During this period he provided (from water drums) all the water that was drunk by a party of 15, including seven adults and eight children.

His observations are set out below:

1. Total water given out during a 72 hour period; 2,812 oz.
2. Average per 24 hour period; 937 oz.

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[134] [1] The Kalahari ostrich egg shell is smaller than that of other areas. The mean capacity of four eggs from the Dobe area is 35.8 ounces (U.S.). (The range of capacities is 33.5, 35. 35.5, and 39.5 ounces.) This compares with an egg from the Cape Province with a capacity of 42 ounces, and an egg from Kenya with a capacity of 46 ounces.

312 3.	Average quantity of water provided to each adult per 24 hour period;	85 oz.
4.	Average quantity of water provided to each child per 24 hour period;	43 oz.

Since the amount of water loss through sweat varies directly with the air temperature, an individual would require more than two eggs-full of water during the summer when the mean daily maximum temperature is 100°F. During the winter, when the mean daily maximum is 85°F, two eggs-full appear to be sufficient.

Similarly, the amount of water loss through sweat varies directly with the intensity of activity, so that an individual would require more water after a day of hard hiking in the sun than he would after a day of comparative inactivity in the shade of the nut forests.

For the present case (winter nut collecting trips) the two-egg figures will be taken as an average.

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For every day of residence away from the permanent water, an individual must carry with him, 72 ounces of water. Therefore a person on a three day collecting trip must carry out four eggshells of water: one for the afternoon of the first day, two for the second day and one for the morning of the third day. Children under 10 years of age can manage on one egg shell of water per full day. Therefore, if a man and wife

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484 with three young children go to the nuts they must carry a
222 minimum of 4+4+2+2+2 = 14 ostrich egg shells filled with water, four for each adult and two for each child. However, most
[426] women own only about six shells. By borrowing shells from other camp members they can bring the total up to the number required for a three day trip.

The antelope stomach sacs offer an increase in water-carrying capacity. A fresh sac will hold up to one gallon (U.S.), i.e. 128 ounces of water, which is the equivalent of 3-1/2 egg shells. Therefore, if a family of five owns two stomach sacs containing 256 ounces of water, this will provide them with one day's supply of water. The 14 egg shells hold three day's supply of water, so that, with two stomach sacs and 14 shells, the family of five can stay an extra day (three nights instead of two) away from the permanent waterhole.

Four days is the upper limit on the time that Bushmen can spend away from a waterhole without a supplement of water from plant sources. There are three reasons for setting the upper limit at four days. First, there is a limit to the number of containers available. Stomach sacs are very fragile and have a short useful life. As they rip they are sewn and this sewing makes their capacity smaller and smaller, so that after six months or so they are discarded. Ostrich egg shells, on the other hand, are much more durable

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and may stay in constant use for years. It is curious therefore that each family possesses less than 10 shells and must borrow shells in order to make these hiking trips to the nuts. The limited number of containers is probably the reason why members of a camp go out to the nuts in shifts. When one family returns, the camp's ostrich egg shells are pooled, and then another family may go out.

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A second limitation is the weight of water that can be carried. The 756 ounces of water required for four days at the nut forest weigh 47 lbs. Each empty ostrich egg shell weighs eight ounces; so that the 14 shells themselves weigh an additional seven lbs. Furthermore it is necessary for the parents to carry the younger children on their shoulders. So, in effect, the parents must walk out to the nut forests fully loaded with water and children and also return fully loaded with nuts and children. On the return trip the weight of the water is replaced by an equivalent weight of collected nuts.

The third limitation is set by the volume that the ostrich egg shells occupy in the carrying space of the kaross. The volume occupied by 14 ostrich egg shells is roughly equivalent to the volume occupied by 14 quart-sized milk bottles. When the time comes for the trip home the adults must pack into each kaross 20 lbs. of nuts, as well as the empty ostrich egg

312 484 222 shells; this makes for a very bulky and unwieldy parcel. The stomach sacs, by contrast to the egg shells, have the distinct advantage of being weightless and occupying no space on the return trip, since when they are empty they dry and shrivel up.

221 222 312 The reader can now appreciate the complex logistics of Bushman subsistence activities during the late winter dry season. In view of the difficulty of collecting mongongo nuts during this season, it is not surprising that the people turn to an eclectic diet of roots, bulbs, and gums that are still available in the vicinity of permanent water.

222 484 855 312 482 Several variations in tactics were observed among the Dobe area Bushmen. One such variation was to leave the older children behind in the care of relatives while the parents made the long trips to the nut forests. By leaving behind two children at the main camp, the parents could effect savings of 30% in the weight of water that had to be carried out on a four day trip.

222 484 312 [482] Another variation observed was the two-day-one-night overnight hike. Such a trip lasted only 36 hours and required only three ostrich egg shells of water per adult. By using this tactic, groups of ten or more people could make a rapid lightly loaded trip to the nut forests and return the following day heavily loaded with nuts. This was a difficult operation

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312 because it entailed two consecutive days of hardhiking on
482 short water rations. The object of such a trip was to get to
484 the nuts and back again as quickly as possible, before the
physiological deficit of water was allowed to reduce efficiency.

221 The general object of the winter nutting trips was to
222 remain at the nut forests just long enough to eat a really
262 substantial quantity of nuts (about 400 nuts per adult).
This marathon meal starts the moment that the Bushmen arrive
at the nut camps and continues throughout their stay. It is
interrupted for short periods when the Bushmen go out to
[539] collect nuts in the vicinity of their temporary camp. There is
a Bushman saying that aptly applies to this situation: "It
is better to carry food home in your stomach than on your
back."

[224] Hunting rarely occurs at these overnight camps. The efforts of men and women alike are directed to eating as many nuts as possible in a short time.

[312] The most important variation in the late winter and spring subsistence tactics centers on the use of _Fockea monroi_ as a source of water. This will be discussed below.

132 6. Early Spring

August is the last month of winter. The last of the freezing nights occurs at the first of the month and these are followed by warmer nights in the 40's and 50's and daily

132 highs in the 90's. The warmer weather heralds the onset of
312 spring which is the most difficult season of the year. Most
137 of the waterholes have no mongongo nuts within a ten mile
222 radius. The alternative foods, roots and bulbs, are being collected daily by some of the people, while others are making the long overnight journeys to the nut forests.

221 Since territories vary in the abundance of early spring
574 foods there was a noticeable tendency for families to visit
628 other camps. For instance in September, Bate still had a good supply of Sclerocarya caffra, nuts, and several families from Dobe, Mahopa, and !angwa converged upon Bate to eat these nuts. Similarly !ubi had a supply of Baobab fruits (Adansonia digititata) and other families made extended visits to relatives there. The maintenance of close ties between camps made possible a more equitable distribution of foodstuffs, so that, if there was scarcity at one camp, and food at another, the members of the first camp would not go hungry. This is one of the highly adaptive features of the fluidity of !Kung group structure.

[563] Some families fall back on the Herero villages at this
[431] time of year to beg for milk. This occurs especially among those people who have a sister or cousin married to a Bantu man. Both the Bushman and Herero codes of good manners demand that visiting in-laws be fed (L. Marshall 1961).

221 433 Unfortunately spring is the most difficult season for the Herero as well as for the Bushmen. The good grazing for livestock is miles distant from the waterholes. Consequently the cattle are in poor condition and their yield of milk is low.

251 It would be useful for the Bushmen to amass a surplus of food in anticipation of this scarce season. However, none of the 15 independent camps observed ever kept more than a few days supply of vegetable foods on hand. Surplus accumulation was not a feature of Bushmen food strategy except for one instructive case.

There was a noticeable attempt to create a small surplus 251 in the form of dried meat and hides. Each family maintained 285 a storage basket in the crotch of a young tree. By weaving a framework of branches and palm fronds and lining this with grass, they built up a rough basket for storing weapons, water containers and small amounts of food. The storage basket was built five feet above the ground which kept its contents safe from the reach of dogs and children. If a day's hunting had been unsuccessful, the members of a camp could invariably produce an emergency ration of dried meat or, more often, dried hide for the evening meal. People saved scraps of dried hide of kudu, gemsbok and wildebeeste from kills made weeks or 251 252 262 months previously. These scraps were softened by boiling or

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262 were roasted in the coals of the fire and then pounded to the consistency of coarse meal in the wooden mortar. This roasted hide had the taste and texture of crisp crackling and was delicious when pounded and mixed with the flesh of roots of the genera Coccinia, Walleria and Eulophia. These stores of dried hide and meat did not serve as a staple surplus so much as an emergency delicacy to brighten the diet when a day's hunting had been unsuccessful.

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824 The major food strategy during the hot dry spring was the 7-14 day trip to the waterless country where mongongo nuts were still plentiful. At these camps the only source of water was the juice from the roots of Fockea monroi. Fockea has an uneven distribution in the Dobe area. The Bushmen must camp in a nut forest that is in close proximity to patches of Fockea. The maximum period that a group was observed to live on Fockea roots was two weeks. The limitation is set by the density of Fockea plants in an area, and the amount of fluid that each plant holds. Life at the Fockea patches is difficult because people have to work hard to obtain water as well as food. Each Fockea root storage organ contains 8-16 ounces of recoverable moisture. Thus a daily ration of 72 ounces of water can be obtained by digging out 5-10 Fockea roots.

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222 But the dilemma of living on Fockea lies in the fact that

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a great deal of energy must be expended in digging out these roots, and the concomitant of this expenditure of energy is a much greater fluid loss through sweating.

It was mentioned earlier that the body's daily water loss is in part a function of the intensity of activity. For instance, an individual who is resting in the shade will lose half the water that is lost by another individual who is walking in the sun.[1] When standing water is available, the amount of energy expended in obtaining water is small. An individual walks a few hundred yards from his camp to the waterhole, drinks his fill there, then fills his water containers and walks back to the shade of his camp. On the other hand, an individual who is living on *Fockea* roots must walk several miles per day in the sun and must dig out a number of large roots that are buried 12-18 inches deep in the hard soil of the molapos. Therefore an individual who drinks *Fockea* juice must first replace the considerable quantity of water that is lost through the effort of searching and digging the *Fockea* roots; this is in addition to the water that is lost in the course of normal daily activities such as hunting, food gathering and resting.

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[1] Adolph and associates (1947) present detailed analyses of this and other factors in sweat production.

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824 The net effect of this effort is that an individual must
222 drink much more than the minimum daily requirement of 72 ounces of water. In fact, men who were living on Fockea roots, were observed to dig out between 15 and 20 of the roots per day. The quantity of water provided by these roots is estimated at 150-300 ounces, part of which went to provide water for the children of the camp.

222 A description of one Fockea trip, in which the author
484 participated, will serve to illustrate some of the difficulties
312 of living away from standing water.

[123] This trip began on 6 November and ended on 16 November, 1964. The group consisted of 12 Bushmen (plus the author); there were three men, four women, and five children. One of the young women gave birth during her stay so the returning group consisted of 13 Bushmen.

November 6 - This group (minus one of the men who came out the following day) set out from the Dobe waterhole at 10:00
[103] a.m. They spent the day walking to a nut forest named !wi/wama which was situated eleven miles west of Dobe. The original plan was to remain there for five days.

[481] The pace was leisurely to suit the three older children
[855] (ages 12, 8, 6 respectively) who went on foot and the young
[843] woman who was in the terminal month of her pregnancy. On the way we stopped at intervals to eat seven different species of

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food plants and to rest in the shade. Towards evening we reached a patch of Fockea roots and spent an hour digging and eating them. Six roots were divided among our group of 12 people. At seven p.m. we made camp in the mongongo nut forests at !wi/wama. Within minutes of our arrival the four women had collected and were cracking mongongo nuts.

Before leaving Dobe, the Bushmen had filled 15 containers with water:

1 kudu stomach sac	4 quarts
2 enamel buckets	4 quarts
12 ostrich egg shells	13-1/2 quarts
Total water carried:	21-1/2 quarts (= c. 700 oz. or water)

On the outward journey, the 12 of us drank four of the ostrich egg shells which had been filled at the Dobe well, plus an estimated two quarts of water from Fockea roots. During the evening, no one drank water until just before bedtime when a further three quarts of water were divided out. Therefore, of the estimated total of 700 ounces of well water, 224 ounces (30%) had been consumed on the first day's hike. It is not known how long the remainder lasted because the author left the camp at the end of the second day.

November 7 - The group woke up at 5:40 a.m. The women were not satisfied with the location of the camp so we packed up and hiked west for another half mile to make camp at a new

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484 location closer to the nuts. By 7:00 a.m. this camp had been
312 deserted. The women and their children had gone to collect
[462] [224] nuts and the men had set out to find Fockea roots and to hunt
along the way. The men carried no water with them on the
hunt. The author accompanied the men.

We walked south for several miles looking for fresh animal tracks and for patches of Fockea plants. We passed through two molapos where the Fockea plants were likely to exist, but to our disappointment we found none. It was 10:00 a.m. before we dug out the first Fockea of the day.
[132] By this time the morning coolness had disappeared and we had
to walk and dig in the sun with shade temperatures about
312 100°F. The first Fockea worth digging were found 4-1/2 miles
824 south of our camp at !wi/wama. The roots were the size of a
football and weighed about three pounds.

The flesh of Fockea is white and juicy with a spongy granular texture. The juice is milky in color and slightly astringent so that it smarts when accidentally rubbed into small cuts on the hands. There are two methods of extracting the moisture from the root. First, one cuts open the root with a knife and chops off chunks of the flesh inside. This may be eaten directly like watermelon. The disadvantage of this method is that one must swallow about three pounds of roughage in order to extract one pint of moisture; in other

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words, 15 lbs. of roughage per day for the minimum water requirment. This is the most efficient means of processing water from _Fockea_ roots because the digestive system can convert all the moisture that is in the _Fockea_ flesh.

However, the Bushmen say (and I can corroborate this) that a man cannot swallow 15 pounds of pulp per day. The stomach becomes full long before one's thirst is quenched. It is probable also that such a great quantity of roughage would put an intolerable burden on the human digestive system, even of people whose digestive systems are accustomed to processing quantities of fibrous roughage.

The more common way of extracting moisture from the root is to squeeze the juice out by hand. The juice may be squeezed directly into the mouth, or squeezed into a cup and then drunk. This is a less efficient way of extracting moisture because much of the juice remains in the fibers after squeezing. Also some of the juice runs down the arms. It does offer a distinct psychological advantage, however, because one is able to drink the juice and thus satisfy the swallowing reflex which is connected with the neurophysiological sensation of thirst (Ladell 1958). Eating the flesh of _Fockea_ does not satisfy this sensation.

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The men continued to eat and drink _Fockea_ from 10:00 a.m. to 12:20 p.m. Then we started to hunt in a northerly direction.

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484 224 222 No game were seen except for a solitary female ostrich. We tracked her to her nest and collected her clutch of nine eggs. Each of the eggs was pounded in the sand to separate the amnion from the inside of the shell. This apparently kills the embryo inside the egg. These nine eggs were divided among the three of us. We then dug out four large Fockea roots intact, and we returned to the camp at 2:30 p.m. after a hike of nine miles.

484 222 462 312 The women of the camp had spent the early part of the morning collecting nuts and Fockea and the rest of the day sitting in the shade cracking nuts and squeezing the Fockea juice. From 2:30 to 4:30 p.m. no one drank any of the water that had been brought the previous day.

484 312 At 4:30 p.m. the third man of the camp arrived from Dobe. He brought with him one gallon of water in an enamel milk pail and portions of a dead kudu that he had scavenged from a carnivore kill on the way.

484 123 312 By this time I was experiencing symptoms of heat distress, (fever, lassitude, inability to swallow) and decided to return to Dobe, because my continued presence would become a burden on the camp residents, none of whom, incidentally, showed any signs of heat discomfort.

One of the men, seeing my condition, offered to accompany me back to Dobe with his family. We left at sunset and walked

484 until 8:00 p.m. Before making camp we ate wild oranges along
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312 the way (Strychnos spinosa) but these did not contain much
moisture. We camped at a point halfway between !wi/wama and
Dobe and there shared out the last of the family's drinking
water, which amounted to one quart for four adults and three
children, that is c. 4-1/2 oz. for each of us.

484 November 8 - The camp awoke at 4:50 a.m. By 5:20 we had
123 packed and were under way, arriving home without incident
at 7:30 a.m.

484 November 8-16 - This ended the author's participation in
312 the Fockea trip. Six members of the original group remained
361 at !wi/wama eating nuts and drinking the juice of Fockea.
On the eleventh of November there was a heavy fall of rain
at !wi/wama which created a temporary pool of water near their
camp. This enabled them to extend their stay beyond the
original plan of five days.

484 The same week that the rain fell, the pregnant woman of
361 the camp gave birth to a baby boy. The group remained at the
844 nut camp until the mother was strong enough to walk. Then
they broke camp and returned to Dobe on November 16.
Both mother and child appeared to be in fine condition.

132 The rain of November 11 was the first substantial fall
221 of the 1964-65 rainy season and initiated the subsistence
activities associated with the late spring (see above). Thus

132 221 this account of the seasonal round has come full circle to the starting point.

312 433 In summary, there are, in effect, only three basic sets of subsistence conditions for the Bushmen:

1. Water everywhere - Food everywhere
2. Water limited - Food abundant
3. Water limited - Food scarce.

221 312 433 When the first set of conditions prevail during the rains
of November through March, Bushman life is sweet. The camps
[628] can live near the most concentrated food sources within their
[574] territory, or share in the food supply of neighboring camps,
[602] or easily undertake the long trips to visit relatives at
distant waterholes.

When the second set of conditions prevail, from April through July, freedom of movement is more restricted but food is still abundant enough to make life comfortable.

When the third set of conditions prevail, from August through October, the Bushmen must resort to increasingly arduous tactics in order to maintain a good diet, or, alternatively they must content themselves with foods of less desirability in terms of abundance, ease of collecting and nutritive value.

It is during the three lean months of the year that the Bushmen life approaches the precarious conditions that have

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433 come to be associated with the hunting and gathering way of life. However one should not lose sight of the fact that for nine or more months of each year the Bushmen can easily fulfill their food requirements without resorting to the more difficult (and, to our eyes, more dramatic) subsistence tactics.

IX. FOOD, WORK AND LAND USE AMONG THE !KUNG BUSHMEN

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An observer planning to live with Bushmen is led to expect - from the ethnographic literature - that the Bushmen lead an arduous and exacting way of life, in which the problem of getting food is an overwhelming daily concern. Furthermore I had been told, by local Europeans, that the Bushmen were extremely shy and difficult to find, and that they were always on the move in their endless quest for game. Therefore I was unprepared for the situation in the Dobe area when I first arrived there at the end of the dry season of 1963; for camped at every waterhole were dozens of Bushmen who offered the outsider a hearty welcome and who were seemingly unconcerned by the problem of finding food.

During the course of the study, it became apparent that the Bushman subsistence was more substantial and secure than had been previously supposed. In the foregoing chapters the properties of their hunting and gathering way of life have been described. It will be appropriate, in this final chapter, to review the lines of evidence that bear on the problem of how such a carefree and secure existence is possible in a society of hunter-gatherers living in a harsh, semi-desert environment.

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824 **Abundance of Resources** -- The habitat of the Dobe area !Kung Bushmen is rich in naturally-occurring foods. The three distinct plant associations - of the Dune, the Flats, and the Molapo - each support a distinctive constellation of food plants. By far the most important of these is the Dune association and its main constituent, the mongongo tree. From the vast groves of this tree, many thousands of nuts are harvested each year. The mongongo nut, because of its abundance and reliability, resembles a cultivated staple crop such as maize or rice. In terms of nutritional value - proteins and sugars - it even exceeds the cereal crops. Furthermore, it is drought-resistant so that the mongongo nut will still be abund-
[221] ant in dry years when cultivated crops fail. The excellent storage properties of the nut allow it to be harvested in all months of the year. This factor is especially important during the dry winter months when the short-term rainy season foods are not available. It is not surprising, therefore, that when the Bushmen are asked to explain why they have not taken to cultivation, they reply: "Why should we plant when there are so many mongongo nuts in the world?"

Variety of Resources -- The mongongo nut is only one, albeit the most important, of the 85 species of edible plants available to the Bushmen. The existence of this variety of foodstuffs

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824 allows for a wide range of alternatives in subsistence strategy. 433 824 221 During the summer months the Bushmen have no problem other than to choose among the tastiest and most easily collected foods; other species which are quite edible but less attractive are simply bypassed, so that gathering never exhausts all the available foods of an area.

During the dry season, when the fruits and melons have gone, the gatherers still have multiple options open to them. They may plan a hike to the molapos to collect the edible Acacia gums, or they may go to the flats to dig out roots and bulbs. Even at the end of the dry season, when the stronger members of a group are making the long hikes to the mongongo forests, the older, less mobile members can derive an adequate subsistence from an eclectic diet of minor foods which are closer to home.

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224 Plants versus Game -- The security of Bushman subsistence derives in part from the fact that meat is of secondary importance to vegetables in the diet. The !Kung males are persistent, but not particularly successful hunters. Although hunting accounts for over half of the subsistence effort of a camp, meat comprises only 20-40 per cent of the diet. The basis of the Bushman diet is plant food, and meat has come to be regarded as a special treat. When meat is available, it is welcomed as a break from the routine of vegetable foods, but it is never

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224 depended upon as a staple. Strictly speaking, the Bushmen should therefore be regarded as gatherer-hunters rather than hunter-gatherers.

The relative scarcity of game in the Dobe area may be related to the widespread diminution of the large African mammals during historic times. It is worth noting, however, that this diminution of game has not led to the collapse of the Bushman way of life. It is sometimes asserted that the decline of large game has contributed to the extinction of hunting-and-gathering peoples in Africa and elswhere. The evidence from the Dobe area refutes this assertion. The Bushmen there have elaborate and sophisticated methods for capturing smaller mammals, and the meat from these kills serves to supplement a diet primarily based on abundant plant resources. The burden of the evidence from this study suggests that the Dobe area Bushmen do not lead an impoverished way of life.

262 Diet Selectivity -- If the Bushmen were living close to the starvation level, then one would expect them to exploit every available source of nutrition. That their life is well above this level is indicated by the fact that, in a given season, they eat only the most attractive of the vegetable foods, and bypass many other available foods. In their meat eating habits the Bushmen show a similar selectivity. Only a few of the dozens of edible species of small mammals, birds, reptiles, and

262 insects that occur locally are regarded as food. Such animals as rodents, snakes, lizards, termites, and grasshoppers, which, in the literature, are included in the Bushman dietary, are despised by the Bushmen of the Dobe area. Even the more attractive larger mammals are hedged round by numerous age-specific, sex-specific, and personal taboos, so that no single Bushman may eat all of the thirty species of mammal that are considered edible. Ritual curers prescribe, for each individual, a series of species that would be highly injurious if the individual were to eat them. These prohibitions are strictly observed. For instance, the wife of ≠oma, the most successful wart-hog hunter, was forbidden to eat the meat of that species and she became sick to her stomach at the mere smell of cooking wart-hog meat. Such strongly-held aversions and selective tastes are cultural luxuries that are not usually associated with a starvation level subsistence.

Leisure and Work -- The getting of food is the most important 462 [512] single activity in Bushman life. This task occupies, on the average, 25 per cent of the womens' days and 40 per cent of the mens' days. The significant point, however, is that the majority of the time of both sexes is spent in non-subsistence [222] activities such as resting, talking, and visiting. In a typical [574] work period, a Bush woman will gather one day and then spend two or three days either resting in camp or visiting other camps,

462 222 574 before she goes out to gather again. The hunters tend to
462 work more frequently than the gatherers. Typically a man will
[224] go out on two or three consecutive days and then spend two or three days in camp. Unlike the women, who maintained a consistent gathering routine throughout the year, the hunting activity of the men came in intermittent bursts. It was not unusual for a man to hunt avidly for a week and then do no hunting at all for two weeks. Since hunting was an unpredictable business, and subject to magical control, hunters would sometimes experience a run of bad luck and would stop hunting for a month or longer. For instance, ≠oma, the best hunter of the Dobe camp, did not hunt at all for a three-month period in 1963 because he said that his luck had left him. He remained in camp, apparently awaiting inspiration, while his wife patiently provided food for him. Most of the men of the Dobe camp went through similar periods of inactivity.

883 Non-productive Camp Members -- People who are under twenty
[887] years and over sixty-five years of age contribute very little to the food input of a camp. Young women are not expected to
[582] contribute food until they are married. Girls typically marry
[574] between the ages of fifteen and twenty, so it is not unusual to find healthy, active, teenagers visiting from camp to camp while their older relatives provide food for them. The assumption of adult responsibility by the boys is even more delayed.

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224 A boy does not begin to play-hunt until he is twelve years
old, and seven or eight years may pass before he kills his
first buck, an event which signals his entry into manhood.
[648] Nowadays many adolescent boys spend several years working on
[464] the Bantu cattle posts where they receive clothing and rations.
[582] This interval of work undoubtedly delays their attainment of
social maturity and boys do not normally marry until they
reach their middle twenties. It is significant that, upon
marriage, practically all of the young men return to the camps
and take up hunting as a full time occupation.

888 The aged hold a respected position in Bushman society.
They are the effective as well as the titular leaders of the
camps. The oldest people are fed and cared for by their children
and grandchildren long after their productive years have
888 passed. The blind, the senile and the crippled are held in
734 awe and respect by the Bushmen, because they often possess
special ritual and technical skills. For instance, /wan!a,
the eighty year old female leader of the !gose camps, was
senile and partially blind, but she was recognized as the
leading exponent of the Women's Curing Dance. The two male
elders of the !gose camps were both totally blind, but this
did not prevent their active participation in decision-making
and in ritual curing.

000 It is suggested that the delayed assumption of social

121 It is suggested that the delayed assumption of social
433 maturity by the young people and the support of the non-pro-
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888 ductive elderly people are institutions which are possible
182 only in a society with a relatively secure subsistence base.

433 Water, Food, and Nomadism -- The special subsistence problems
312 faced by the Dobe area Bushmen concern the scarcity of water.
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361 All of the eight natural permanent waterholes are situated in
or near the beds of the main molapos. During the summer months, when temporary pools develop at a distance from permanent water, the Bushmen can move out to live at them. Except for a few weeks each year, the Bushmen spend their entire lives camped within an hour's walk of standing water. Only at the end of the dry season do some of the younger people undertake the long trips to the dry forests where they live by digging out the water-bearing roots. Since it is the custom of the Bushmen to return each evening to their main camps, it follows that areas within a single day's walk of standing water will be intensively utilized. Areas that lie beyond this radius will be rarely utilized even though they may be rich in food. The fact that the Bushmen can live well for most of the year within a six-mile radius of permanent water indicates that they do not lead a nomadic way of life. Each summer they move up-country to the seasonal waters and each winter they fall back on their permanent waterholes. In contrast to some Australian aboriginal groups, whose annual round consists of walking a circuit of many waterholes, the Dobe area Bushmen have a

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361 transhumant annual round, in which they alternate between their rainy season range and their dry season range.

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628 The Dobe area !Kung do not undertake long marches of 30-70 miles for the purpose of getting food. This task can be readily fulfilled within a day's walk of their territorial water sources. When such long marches occur, they are invariably for the purposes of visiting, trading, and marital exchanges with relatives at distant camps. As such, these trips should not be confused with the normal routines of subsistence.

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162 *Range Size and Population Density* -- By plotting the movements of the various camps in their annual subsistence cycle, the observer can derive a rough estimate of the total land area that is required to support the population of 430 Bushmen. It would be much more difficult to estimate the area necessary to support a single camp, because of the considerable overlap of territories and the frequent visiting between camps. It will be more useful to treat the entire population as a unit. It is estimated that the 800 square miles that lie within a six-mile radius of major water sources are sufficient to support the population for most of the year. Beyond this radius lies a hinterland which is rarely penetrated; perhaps a further 200 square miles of this hinterland is utilized in the course of a single year. Thus the total annual range of the Dobe area Bushmen may be estimated at 1,000 square miles. This calculation sets the effective population

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162 density at ca. 43 persons per 100 square miles, or two-and-a-half square miles per person. This is a rather high density figure for desert-living hunters and gatherers. The higher figure is partly due to the fact that it represents the ratio of population to the actual land area utilized. This is a more meaningful way of expressing density than is a figure based on the ratio of population to the total land area that it appears to occupy. For instance, on a map, the Dobe area covers about 2,700 square miles, but the Bushmen actively utilize less than 40 per cent of this area. It is suggested that estimates of population density for other hunting and gathering peoples would give accordingly higher values if the criterion of actual use was employed in the calculation.

Conclusion

433 These eight lines of evidence constitute the case for a revision of the anthropological view of the Bushmen. Their way of life is not impoverished or precarious. Considering the environment in which they live, the Dobe area !Kung Bushmen lead an unexpectedly comfortable and secure existence. The evidence set out here assumes an added significance because this security of life was observed during a period of severe drought. Consequently the author witnessed the worst conditions that the !Kung would have to face. One can speculate that their

433 subsistence base would be even more substantial during a year of higher rainfall. The Kalahari desert is by any account a marginal habitat for human occupation. Nevertheless it is apparent that the people who live there can satisfy their subsistence needs with a reasonable amount of effort and within a short compass of their waterholes.

The Subsistence Base of Other Hunter-Gatherers

It remains to be considered whether the !Kung Bushmen are exceptional among hunters and gatherers in that they have an unusually reliable subsistence base in the form of the mongongo nut.

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433 A brief survey of the living hunting and gathering peoples indicates that the !Kung are quite typical of the general picture. For instance, the coastal Tierra del Fuegians, the California Indians, the Strandloopers of South Africa, and the Australian aborigines of Arnhem Land, the Cape York Peninsula, and New South Wales all possessed a superabundant staple of marine resources, especially shellfish. In the interior of California the acorn was the superabundant staple. Even the lowly Shoshoneans of the Great Basin who, because of scarce resources, were forced to exist at the "family level of organization" possessed a superabundant staple in the form of piñon nuts (Steward 1955). These nuts were so abundant that quantities could be collected and stored sufficient to last through the winter. Furthermore, the winter encampments typically consisted

171 of 20 or 30 families living in one locality (Steward 1955:105).
433 Such a camp would contain upwards of 60 people and therefore would have been as large as the larger of the Dobe Bushmen winter camps. Even larger aggregations occurred among the Shoshone on the occasion of the communal rabbit hunts. In light of this, one suspects that the subsistence basis of the Shoshone was more secure than their ethnographer was prepared to allow.

It is not known what the staple food resource of the desert aborigines of Australia may have been, but there is compelling evidence that such a staple did exist. This is based on the fact that groups of 300-500 Aranda and Walbiri have been observed to congregate for four to five months at a time (Strehlow 1947:65; Meggitt 1962:55). Such concentrations of population could not have been possible without a superabundant source of food.

It is suggested that the literature on the living hunters and gatherers of the world deserves to be reconsidered in light of this abundant food base. It appears that anthropologists have tended to underestimate hunting and gathering as a viable and persistent way of life. Despite the fact that non-agricultural peoples today are confined to the least attractive habitats of the world, there is evidence that human ingenuity, such as that displayed by the Dobe area Bushmen, can produce a substantial living from even the most unpromising environments.

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